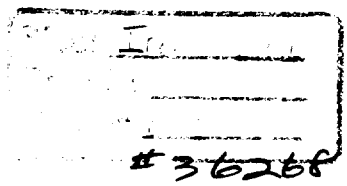

RECORD OF DECISION SUMMARY

SHAFFER LANDFILL,
IRON HORSE PARK SITE
BILLERICA, MASSACHUSETTS

JUNE 27, 1991

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION I

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

DECLARATION FOR THE RECORD OF DECISION

SHAFFER LANDFILL, IRON HORSE PARK
BILLERICA, MASSACHUSETTS

STATEMENT OF PURPOSE

This decision document represents the selected remedial action for the Shaffer Landfill, Iron Horse Park Site in Billerica, Massachusetts, developed in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986, and to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP), 40 CFR Part 300 et seq., as amended. The Regional Administrator has been delegated the authority to approve this Record of Decision.

The Commonwealth of Massachusetts has concurred on the selected remedy.

STATEMENT OF BASIS

This decision is based on the Administrative Record which has been developed in accordance with Section 113 (k) of CERCLA and which is available for public review at the Billerica Public Library in Billerica, Massachusetts and at the Region I Waste Management Division Records Center in Boston, Massachusetts. The Administrative Record Index (Appendix F to the ROD) identifies each of the items comprising the Administrative Record upon which the selection of the remedial action is based.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to the public health or welfare or to the environment.

DESCRIPTION OF THE SELECTED REMEDY

This ROD sets forth the selected remedy for the second operable unit at the Iron Horse Park Site, which addresses the Shaffer Landfill, which is just one part of the overall Site.

The selected remedial action for the Shaffer Landfill Operable Unit described in this ROD consists of source control measures which will also control the continuing migration of contaminants from the landfill.

The major components of the selected remedy include:

- Reconstruction of the cap over the entire 60 acres of landfill surface;
- Maintenance of cap, surface drainage system and landfill gas collection/flare system;
- Monitoring of gas collection/flare system;
- Monitoring of groundwater and surface water quality;
- Construction, operating and maintenance of the leachate collection facilities;
- Offsite treatment and disposal of leachate;
- Construction of site perimeter security fence;
- Institutional controls; and
- Post Closure Plan.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate for this remedial action and is cost-effective. This remedy satisfies the statutory preference for remedies that utilize treatment as a principal element to reduce the toxicity, mobility, or volume of hazardous substances. In addition, this remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

As this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Paul Keough, Acting

Julie Belaga
Regional Administrator
U.S. EPA, Region I

REGION I

RECORD OF DECISION

SHAFFER LANDFILL OPERABLE UNIT

IRON HORSE PARK, BILLERICA, MASSACHUSETTS

JUNE, 1991

SHAFFER LANDFILL OPERABLE UNIT

IRON HORSE PARK

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IRON HORSE PARK, SHAFFER LANDFILL SUMMARY
JUNE, 1991

I. SITE NAME, LOCATION AND DESCRIPTION

This Record of Decision (ROD) is for the cleanup of the Shaffer Landfill (the Landfill) at the Iron Horse Park Superfund site (the Site) in North Billerica, Massachusetts. The Shaffer Landfill is located on 106 acres of land east of Pond Street and south of Richardson Pond within the boundaries of Iron Horse Park. The Landfill itself covers approximately 60 acres and was used for disposal of residential and commercial solid waste for a period of more than 30 years.

The Shaffer Landfill is divided into two physically distinct sections. The western section includes approximately 24 acres of landfill and is referred to as the "Residential Section". The eastern section includes approximately 36 acres of landfill and is referred to as the "Commercial Section". A more complete description of the Shaffer Landfill can be found in the Phase 1A Remedial Investigation Report for Iron Horse Park (July, 1987), and the Phase 1C Remedial Investigation Report for the Shaffer Landfill, Iron Horse Park (November, 1989).

The Shaffer Landfill comprises just one part of the Iron Horse Park Superfund site. The entire Site consists of approximately 552 acres of land in North Billerica, near the Tewksbury town line. The Site is an active industrial complex and railyard with a long history of activities that have resulted in contamination of soils, groundwater, and surface water. The Site includes open storage areas, landfills, and lagoons. A more complete description of the Site can be found in the Phase 1A Remedial Investigation Report (See maps in Appendix A of this Record of Decision).

- **LOCATION AND ADDRESS OF THE SITE**

The Shaffer Landfill is accessed through a gate on Pond Street located approximately 1 mile north of the intersection of Route 129 and Pond Street.

- **GEOGRAPHICAL AND TOPOGRAPHICAL OVERVIEW OF THE SITE AREA**

The Shaffer Landfill is situated in what was primarily a wetland area and is, at present, surrounded by wetlands and surface water bodies. Richardson Pond is located to the north of the Shaffer Landfill, across the Boston and Maine railroad tracks. Content Brook drains Richardson Pond at its southeast corner. Content Brook runs generally north to south, east of the commercial section of the Landfill, and merges with the Middlesex Canal in the southern portion of the Site. The Middlesex Canal forms the southern boundary of the Site. The eastern and southern portions of the Landfill are located within the boundaries of the 100-year floodplain. Land use adjacent to the

Shaffer Landfill is industrial to the west across Pond Street and primarily residential past the bordering wetlands to the north, east, and south.

Groundwater in the area around the Landfill is not currently being used for drinking water. Some fishing is known to occur in both Content Brook and Richardson Pond. In addition, there is evidence (tire tracks, shot-gun shells) that the Shaffer Landfill and surrounding areas are used for recreational purposes.

The summit of both the Commercial and Residential sections are at approximately 180 ft. above sea level. The base of the Landfill lies at 110-120 ft. above sea level. The area immediately surrounding the Landfill is relatively flat with a low profile. The twin flat-topped mounds of the Landfill are the highest elevation features in the area.

- **GEOLOGIC-HYDROGEOLOGIC CHARACTERISTICS**

Underlying the Landfill is bedrock composed of schist and granite with a varied profile. This bedrock runs unevenly beneath the Landfill at a depth of roughly 5 to 60 feet below the surface. The overburden is mainly glacial outwash, consisting primarily of medium-grained sand with occasional fine gravel lenses. The overburden deposits range up to about 60 feet in thickness and in general become thinner from northwest to southeast. The uppermost portion of the overburden deposit is organic topsoil with a thickness of 1 to 3 feet. Groundwater in and around the Landfill flows generally from west to east, with some local sub-trends within the Landfill area itself. In the western portion of the Landfill (the western portion of the Residential Section to Pond Street), groundwater flows northeast toward Richardson Pond. In the central portion of the Landfill, groundwater flows northeast and southeast at a very low gradient. In the eastern portion of the Landfill, groundwater flows southeast toward Content Brook. Richardson Pond and Content Brook are hydrologically connected to groundwater, and receive discharge from near-surface groundwater. The Middlesex Canal does not appear to be hydrologically connected with groundwater with the exception of a possible area of interaction near the confluence of the Middlesex Canal and Content Brook.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. Response History and Land Use

i. Response History

The Site was placed on the National Priorities List in September 1984 following investigations by the Massachusetts Department of Environmental Quality Engineering (now the Massachusetts Department of Environmental Protection or MADEP) in the early 1980's and a Site Investigation Report completed by the NUS Corporation for EPA in

August 1984.

In August 1984, EPA, under its removal authority, covered a portion of the Site known as the John-Manville Asbestos Landfill with gravel and topsoil to prevent asbestos in the landfill from becoming airborne.

In 1985, EPA began investigations of the Site to determine the nature and extent of contamination. Under the first phase of the evaluation, EPA conducted a broad study of the Site to define the potential problem areas. This study was entitled the Phase 1A Remedial Investigation (RI). As a result of the Phase 1A RI, EPA concluded that the size and complexity of the Iron Horse Park Site necessitated using a phased approach to study it and to determine what cleanup work may be needed. Under this approach, the Site was separated into a number of different problem areas. Where possible, the areas studied and the decisions on how to clean them up are made as operable units. An operable unit is a discrete portion of an entire response action that, by itself, manages migration or eliminates or mitigates a release, threat of release, or pathway of exposure.

The B & M Lagoons were the first operable unit addressed at the Site. In August 1987, EPA began work on a second remedial investigation that focused on the nature and extent of contamination in and around the B & M Lagoons. EPA completed this study, referred as the Phase 1B RI, in May 1988. In addition to the Phase 1B RI, the Feasibility Study (FS) of potential remedial alternatives for the cleanup of the B & M Lagoons was issued in June 1988. A Record of Decision for this first operable unit was issued in September 1988. Work is currently underway on this portion of the Site.

The Shaffer Landfill is the second operable unit at the Site. In 1989, EPA completed a study of the nature and extent of contamination at the second operable unit of the Site in a report referred to as the Phase 1C RI. In January 1991, EPA completed a Feasibility Study that describes the potential remedial alternatives for the Shaffer Landfill. The Shaffer Landfill is the subject of this Record of Decision.

The Landfill is currently being closed pursuant to a judicial settlement (Final Judgment) entered into on June 12, 1984 between the Commonwealth of Massachusetts and the owners of the Landfill. The closure activities which have taken place thus far include construction of a two layer cover system or cap consisting of a low permeability layer and a topsoil vegetative layer, and a gas collection/flare system. There are problems with the cap, the gas collection/flare system, and the operation and maintenance of the facility. In addition, no leachate collection system has been installed. For a more complete description of closure work which has taken place to date see Section 2.5 of the Phase 1C Feasibility Study.

ii. Land Use

The Shaffer Landfill is located on property originally owned by the Boston & Maine Corporation. Records from the MADEP and the Town of Billerica indicate that the property was used for rubbish disposal beginning in 1946 and was operated as an open burning dump for over 20 years. Records indicate that throughout most of its history the Landfill accepted a wide variety of commercial and residential refuse. In 1966, the Boston & Maine Corporation sold the Landfill to the Shaffer Realty Corporation. Title to the property was then transferred to the Graypond Realty Trust. Graypond Realty Trust is the current owner of the Landfill.

Aerial photographs show that until at least the early 1960's, the area used for landfilling was restricted to the westernmost portion of what is now known as the Residential Section. By 1969, the Residential Section had reached roughly its current areal extent, while to the east, the Commercial Section did not exist (the site of the Commercial Section was still primarily wetland). The Commercial Section began to appear in aerial photographs in 1970, and appears to be near full areal development in a 1976 photograph. As part of the 1984 settlement with the Commonwealth of Massachusetts, the Landfill ceased operation in 1986.

B. Enforcement History

To date, EPA has notified approximately nine parties of their potential liability for response actions taken and to be taken at the Site.

Prior settlements have been negotiated with some of these potentially responsible parties (PRPs) for the Johns Manville asbestos removal action and the B & M Lagoons first operable unit. Negotiations with the PRPs for implementation of the Shaffer Landfill operable unit remedial action will not commence until after the remedy selection process is complete.

The PRPs have been active in the remedy selection process for the Landfill. Technical and general comments presented by the PRPs in writing during the public comment period were summarized by EPA, and the summary, as well as responses to those summarized comments are included in the Responsiveness Summary which is in Appendix E of this Record of Decision.

In addition to the federal enforcement efforts, Massachusetts has been actively involved at the Landfill in enforcement of state environmental requirements. After issuing a series of violation notices and administrative orders citing noncompliance with numerous Massachusetts regulatory requirements, Massachusetts filed suit in an attempt to obtain compliance at the Shaffer Landfill. A settlement was reached by the parties in 1984. This settlement required the

Landfill to close and prescribed the terms of closure. Work is proceeding under this settlement and is discussed in Section II.A.i, above.

III. COMMUNITY PARTICIPATION

Throughout the Site's history, community concern and involvement has been high. EPA has kept the community and other interested parties apprised of the Site activities through informational meetings, fact sheets, press releases and public meetings.

During August 1985, EPA released a community relations plan which outlined a program to address community concerns and keep citizens informed about and involved in activities during remedial activities. Since 1985, several informational and public meetings have been held with the community to discuss the original site-wide investigation, the asbestos removal and the B & M Lagoons cleanup.

On August 17, 1989, EPA held an informational meeting in Billerica, MA to discuss the results of the Phase 1C Remedial Investigation for the Shaffer Landfill.

On January 16, 1991, EPA made the administrative record for the Shaffer Landfill available for public review at EPA's offices in Boston and at the Billerica Public Library. EPA published a notice and brief analysis of the Proposed Plan in the Lowell Sun on January 10, 1991 and made the plan available to the public at the Billerica Public Library. In addition, EPA has sent several hundred parties potentially interested parties letters, that provide parties that may have some association with the Landfill an opportunity to participate in the remedy selection process.

On January 15, 1991, EPA held an informational meeting to discuss the results of the Remedial Investigation and the cleanup alternatives for the Landfill presented in the Feasibility Study and to present the Agency's Proposed Plan. Also during this meeting, the Agency answered questions from the public. From January 16, 1991 to March 16, 1991, the Agency held a 60 day public comment period to accept public comment on the alternatives presented in the Feasibility Study and the Proposed Plan and on any other documents previously released to the public. On February 5 and 19, 1991, the Agency held public meetings to discuss the Proposed Plan and to accept any oral comments.

On May 16, 1991, EPA issued the Supplement to the Proposed Plan which described a new preferred alternative for the cleanup of the Landfill. From May 17, 1991 to June 17, 1991, EPA held an additional 30-day public comment period to accept public comment on the Supplement to the Proposed Plan and on any other documents previously released to the public. A transcript of the February 5, 1991 and February 19, 1991 meetings, a summary of comments submitted during the comment period, and the Agency's response to these summarized comments are

included in the attached responsiveness summary.

IV. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

The Selected Remedy for the Shaffer Landfill is the second operable unit of at least a three operable unit approach to the remediation of the Iron Horse Park Superfund Site. Because of the complexity of the Site and the discrete nature of the problem at the Shaffer Landfill, cleanup as an operable unit is appropriate and consistent with the entire response at the Site. The Selected Remedy is, similar to the asbestos removal and the B & M Lagoon remedial action, an incremental step toward comprehensively addressing the problems at the Site. The third operable unit will address the other areas of concern at Iron Horse Park that were identified during the Phase 1A RI.

The Selected Remedy was developed by combining components of different source control and management of migration alternatives to obtain a comprehensive approach for remediation of this operable unit. In summary, the remedy provides for: reconstruction of the Landfill cap; collection, treatment and disposal of leachate; an air quality study; monitoring the gas collection/flare system and making improvements if necessary; and monitoring surface water and groundwater quality.

This remedial action will address the following principal threats to human health and the environment posed by the Landfill:

1) Leachate migration contaminating aquifer (not a current drinking water source) and surface waters;

2) Degradation and loss of surrounding wetlands; and

3) Air emission quality.

V. SUMMARY OF SITE CHARACTERISTICS

Chapter 2.0 of the "Final Draft Phase 1C Feasibility Study for the Shaffer Landfill" contains an overview of the Phase 1C RI. The study area included the Shaffer Landfill property as described earlier, as well as the groundwater, surface water, sediments, and wetlands in the area surrounding the property. The significant findings of the Phase 1C RI are summarized below:

A. Groundwater

Groundwater flows in three directions in and around the Shaffer Landfill area. West and southwest of the Landfill, groundwater flows north toward Richardson Pond. In the central portion of the Landfill, groundwater flow is both north toward Richardson Pond, and south toward the Middlesex Canal. In the eastern portion of the Landfill,

groundwater flows to the east and southeast. As part of the process of reaching these conclusions on flow, EPA installed 12 new monitoring wells and used 37 existing monitoring wells in its study of groundwater at the Shaffer Landfill (See map in Appendix A of this Record of Decision).

Biochemical oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), iron, manganese, and conductivity levels in groundwater are indicators that, when elevated, are typically associated with landfill leachate. The highest levels of these indicators and the highest levels of priority pollutant volatiles and metals, some at levels above Maximum Contaminant Levels (MCLs) have been found in groundwater directly adjacent to the eastern, northern and southern toes of the Landfill. In addition, elevated levels have been detected east of the Landfill toe in the direction of Content Brook. Based on the elevated levels of BOD, COD, TDS, iron, manganese and conductivity, leachate is flowing from the Landfill to the east and southeast. This is consistent with the direction of groundwater flows, and with the observation of leachate breakouts at the Shaffer Landfill. Beyond Content Brook to the east, samples from wells GZA-9A, 9B, 10A, and 10B did not show evidence of leachate constituents at levels above those observed upgradient of the Landfill. Somewhat elevated levels of TDS have been found at well GZA-9B indicating that migration of landfill contaminants may have occurred beneath and beyond Content Brook in the lower portion of the aquifer.

The most significant contamination observed in the groundwater has been found along the eastern toe of the Landfill. Elevated levels of chloride, manganese, iron, arsenic and VOCs have consistently been detected in wells GZA-3 and KE both screened into the lower portion of the overburden aquifer. Concentrations of arsenic and VOCs found in well GZA-3, which are considered representative of the worst contamination, are as follows:

CONTAMINANT	CONCENTRATION
Arsenic	258 ppb
Benzene	91 ppb
1,2-Dichloroethane	55 ppb
1,2-Dichloroethene	120 ppb
Ethylbenzene	350 ppb
Methylene Chloride	500 ppb
Toluene	840 ppb
1,1,2-Trichloroethane	16 ppb
Trichloroethene	6.1ppb
Vinyl Chloride	130 ppb
Xylene	1500 ppb

Shallow wells KW, GZA-4 and M, located near KE and GZA-3, have shown lower levels of contaminants, possibly indicating that dilution of shallow groundwater is occurring from local recharge. The only

significant levels of acid/base/neutral (ABN) compounds were found in well MW-7 downgradient from the Landfill along Gray Street. However, analysis of samples from other downgradient wells closer to the Landfill did not detect ABN compounds.

Inorganic contaminants other than arsenic (lead, chromium) have been detected at elevated levels in groundwater upgradient of Shaffer Landfill. These locations are west and south of the Landfill. Chromium was detected in downgradient well MW-6A, but at a level well below the MCL and below the levels detected upgradient of the Landfill. Lead was not detected in any downgradient wells.

B. Surface Water

Surface water samples were collected from 19 locations in the area surrounding the Shaffer Landfill to determine the nature and extent of contamination present within this media. Samples collected from the southern edge of Richardson Pond (SW-22), and from Content Brook (SW-30, SW-102, and SW-117) contained low levels of volatile organics, with the highest levels being detected at SW-22. No significant levels of ABN compounds were found in surface water samples.

Inorganic contaminants were detected above MCLs both upgradient and downgradient of the Shaffer Landfill. Inorganics detected above Ambient Water Quality Criteria (AWQCs) at downgradient sampling location SW-117 (Content Brook) include:

CONTAMINANT	CONCENTRATION		AWQC(s) EXCEEDED
barium	3690	ug/l	Water & Fish Ingestion
mercury	2.2	ug/l	All except Fresh Water Acute (Protection of Aquatic Life)
lead	1260	ug/l	All
nickel	564	ug/l	All except Fresh Water Acute
arsenic	54	ug/l	Fresh Water Chronic
chromium	811	ug/l	All

Although the geographic distribution of these inorganic contaminants did not seem to follow any particular pattern, SW-117, immediately downgradient of the Landfill, exhibited a higher number and generally higher levels of inorganics above MCLs than any upgradient location. In addition, SW-117 was the only location where the AWQCs for nickel were exceeded. The remedy for this operable unit addresses the landfill, leachate and groundwater only. Surface waters will be looked at in the next operable unit to determine if Superfund is the most appropriate mechanism to deal with this medium.

C. Sediment

Sediment samples were collected at 33 locations in the Shaffer

Landfill area. Low levels of VOCs were detected in sediments found on the southern edge of Richardson Pond. Comparing the VOCs detected in these sediments with those detected in surface water at the same location, shows that only acetone and toluene were detected in both media.

ABN compounds were widely detected in sediments both upgradient and down gradient of the Shaffer Landfill. The highest concentrations of ABNs by far, were found upstream of the Landfill, on the far western edge of Richardson Pond (SD-111) and west of Pond Street south of the Middlesex Canal (SD-115).

In general, ABNs and a variety of metals such as arsenic, lead and zinc were found in the sediments along the Middlesex Canal, Content Brook and Richardson Pond both upgradient and downgradient of the Shaffer Landfill.

A complete discussion of site characteristics can be found in the Phase 1C Remedial Investigation Report in Sections 2, 3, and 4.

D. Air

As part of the Landfill's gas collection system, the owners have installed a gas vent/flare system for air pollution control. MADEP required that a permit be issued for operation of the gas vent/flare. As a part of the process of obtaining a permit to operate the flare/vent system, testing of emissions was conducted. The results of these tests were used to perform computer modeling to estimate potential off-site exposures to emissions. This modeling effort, completed in November, 1988 predicted emission concentrations off the Landfill property orders of magnitude below allowable levels.

In 1990, following complaints of odors by local residents, MADEP conducted some additional sampling at the Landfill to identify the specific source of odors (fissures in the existing cap or gas collection wells), and to do some identification and quantification of specific airborne contaminants. This testing found a number of contaminants at elevated levels. These samples were taken in the gas extraction well heads and at collection system vents at the surface of the Landfill. Although not found at all sample locations, these contaminants include: benzene, toluene, xylenes, 1,1,1-trichloroethane, and trichloroethylene. MADEP had determined that there was a risk associated with continuous exposure to these levels to people on-site but that there was no indication that anyone off-site was being exposed to elevated levels of these contaminants. No further work to determine off-site exposure scenarios has taken place.

VI. SUMMARY OF SITE RISKS

An Endangerment Assessment (EA) was performed to estimate the

probability and magnitude of potential adverse human health and environmental effects from exposure to contaminants associated with the Landfill. The EA is found in Chapter 6 of the Phase 1C Remedial Investigation Report (RI). The public health risk assessment followed a four step process: 1) contaminant identification, which identified those hazardous substances which, given the specifics of the Landfill, were of significant concern; 2) exposure assessment, which identified actual or potential exposure pathways, characterized the potentially exposed populations, and determined the extent of possible exposure; 3) toxicity assessment, which considered the types and magnitude of adverse health effects associated with exposure to hazardous substances; and 4) risk characterization, which integrated the three earlier steps to summarize the potential and actual risks posed by hazardous substances at the Landfill, including carcinogenic and non-carcinogenic risks. The results of the public health risk assessment for the Shaffer Landfill are discussed below followed by the conclusions of the environmental risk assessment.

Twenty-six contaminants of concern, listed in Appendix B of this Record of Decision were selected for evaluation in the Endangerment Assessment.

These contaminants constitute a representative subset of the more than thirty-eight contaminants identified at the Landfill during the Phase 1C RI. The twenty-six contaminants of concern were selected to represent potential site related hazards based on toxicity, concentration, frequency of detection, and mobility and persistence in the environment.

Potential human health effects associated with exposure to the contaminants of concern were estimated quantitatively through the development of two hypothetical exposure pathways - ingestion of ground water and direct contact with sediment. These pathways were developed to reflect the potential for exposure to hazardous substances based on the present uses, potential future uses, and location of the Landfill. For each pathway evaluated and, where possible, an average and a reasonable maximum exposure estimate was generated corresponding to exposure to the average and the maximum concentration detected in that particular medium. The following is a brief summary of the exposure pathways evaluated. A more thorough description can be found in Sections 6.3 and 6.4 of the Phase 1C RI.

Groundwater

The groundwater is not currently being used as a drinking water source. Therefore, only future use of the groundwater as a drinking water supply was evaluated as a potential exposure pathway. Separate risk assessments were calculated for groundwater at the Landfill perimeter (well GZA-3) and for five downgradient wells (wells MW-4, MW-5, MW-6, MW-7 and RFW-1). Well GZA-3 is the most contaminated well at the Landfill and risks exceed EPA's acceptable risk range.

Contaminant levels and associated risks in the downgradient wells are very low with the exception of pentachlorophenol, a chemical which was not detected in the Landfill perimeter well. Reasonable maximum exposure scenarios were developed for the Landfill perimeter well and the downgradient wells. An average exposure estimate was developed for the downgradient wells. The risk assessments assumed a lifetime of consuming 2 liters of water per day.

Sediment

The potential present and future exposure of children playing along the Middlesex Canal and Content Brook to contaminated sediment via dermal contact and incidental ingestion was evaluated. One exposure scenario was developed to describe both the present and future potential exposures. It was assumed that children aged 6 to 15 years could be exposed daily from June to September via wading in the Canal and Brook.

Potential adverse health effects from exposure to lead in sediment were evaluated using a uptake/biokinetic model to estimate blood lead levels.

Surface Water

Contaminant concentrations in surface water were so low that a formal quantitative Endangerment Assessment was not performed. In this medium, exposure via dermal contact and incidental ingestion while wading or swimming were not considered to be of concern.

Baseline Risk Assessment

Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level with the chemical specific cancer potency factor. Cancer potency factors have been developed by EPA from epidemiological or animal studies to reflect a conservative "upper bound" of the risk posed by potentially carcinogenic compounds. That is, the true risk is very unlikely to be greater than the risk predicted. The resulting risk estimates are expressed in scientific notation as a probability (e.g. 1×10^{-6} for 1/1,000,000) and indicate (using this example), that an individual is not likely to have greater than a one in a million chance of developing cancer over 70 years as a result of site-related exposure as defined to the compound at the stated concentration. Current EPA practice considers carcinogenic risks to be additive when assessing exposure to a mixture of hazardous substances.

The hazard index was also calculated for each pathway as EPA's measure of the potential for non-carcinogenic health effects. The hazard index is calculated by dividing the exposure level by the reference

dose (RfD) or other suitable benchmark for non-carcinogenic health effects. Reference doses have been developed by EPA to protect sensitive individuals over the course of a lifetime and they reflect a daily exposure level that is likely to be without an appreciable risk of an adverse health effect. RFDs are derived from epidemiological or animal studies and incorporate uncertainty factors to help ensure that adverse health effects will not occur. The hazard index is often expressed as a single value (e.g. 0.3) indicating the ratio of the stated exposure as defined to the reference dose value (in this example, the exposure as characterized is approximately one third of an acceptable exposure level for the given compound). The hazard index is only considered additive for compounds that have the same or similar toxic endpoints (for example: the hazard index for a compound known to produce liver damage should not be added to a second whose toxic endpoint is kidney damage).

Results of Baseline Risk Assessment

Tables A through F, found in Appendix B of this Record of Decision, summarize the adverse human health effects for the exposure pathways identified above.

The estimated reasonable maximum exposure carcinogenic risk for future potential ingestion of Landfill perimeter groundwater was 2 cancer cases in 100. In other words, for a population drinking two liters of the Landfill perimeter groundwater per day for 70 years, 2 cancer cases would be expected for every 100 people. Arsenic comprised 50% of this risk estimate and vinyl chloride 43%. Other chemicals which contribute a risk of greater than one in a million included benzene, 1,2 dichloroethane, methylene chloride and 1,1,2 trichloroethane. Because one well was considered representative of the Landfill perimeter contamination and was used in estimating risk, an average value cannot be calculated.

For noncarcinogenic effects, the reasonable maximum Hazard Indices estimated for the potential future ingestion of groundwater at the Landfill perimeter exceeded one for three adverse health effects: keratosis (skin discoloration), fetotoxicity (fetal effects), and adverse liver effects. A Hazard Index greater than one means that there may be concern for these adverse effects occurring to residents drinking Landfill perimeter groundwater over 70 years. Arsenic, benzene and vinyl chloride are the major contaminants for these toxic endpoints, respectively. Because one well was considered representative of the Landfill perimeter contamination and was used in estimating risk, an average value cannot be calculated.

The estimated carcinogenic risk for future potential ingestion of downgradient groundwater ranged from an average of one cancer case in ten thousand to a reasonable maximum exposure of 4 in ten thousand. In other words, for a population drinking two liters of the downgradient groundwater per day for 70 years, an average of 1 cancer

case, and a maximum of 4 cancer cases would be expected for every ten thousand people. Pentachlorophenol contributes 100% of this risk.

The Hazard Indices for similar toxic endpoints for the future ingestion of the downgradient groundwater was less than one for both the average and reasonable maximum exposures. This means that there is not a concern of non-carcinogenic adverse health effects in people who may potentially drink this downgradient groundwater over a 70 year period.

Contaminant concentrations in the Landfill perimeter well used for the Baselined Risk Assessment (GZA-3) exceeded EPA's goal for carcinogenic and noncarcinogenic effects. The concentrations in the downgradient wells did not meet EPA's goal for carcinogenic health effects but met the goal for noncarcinogenic effects.

Contaminant concentrations in sediment were well below EPA's goal for carcinogenic and noncarcinogenic health effects, respectively. The estimated blood lead level was below levels believed to cause adverse health effects.

Environmental Assessment

An Environmental Risk Assessment was conducted to determine the environmental effects due to leachate seeps to surface water and wetlands surrounding the Landfill. The area examined for the purpose of this assessment was the Richardson Pond wetland. A review of historical information and field surveys confirmed the presence of visible leachate seeps in this wetland which may have originated from the Shaffer Landfill. The Environmental Assessment can be found in Section 6 of the Phase 1C Remedial Investigation, pages 6-1 to 6-10. The assessment included a qualitative vegetation survey, a semi-quantitative fish survey, fish tissue analyses, a quantitative macroinvertebrate analysis and sediment analysis.

The vegetation and fish surveys showed little if any effect attributable to the Landfill. The fish tissue analyses show the presence of pesticides and PCBs; however there are more compounds and at higher levels in tissue samples obtained from Long Pond which is upstream of Richardson Pond. In addition, of the contaminants detected in fish tissues, only heptachlor was found in Richardson Pond sediments. Sediments are the normal expected source of pesticides found in fish tissue.

The macroinvertebrate analysis showed a significant reduction in species diversity and abundance when comparing Richardson Pond to Long Pond, although this was not accompanied by conditions indicative of severe water quality deterioration. Immediately downstream of Richardson Pond the macroinvertebrate population showed significant evidence of recovery. The sediment analysis detected a large inventory of PAHs in Richardson Pond. There is evidence of

significant reductions of contaminants immediately downstream of Richardson Pond which is consistent with the observed recovery in the macroinvertebrate community. In conclusion, there is a clear adverse effect to macroinvertebrates in the Richardson Pond wetland. Whether this effect is solely a result of contaminant contribution from Shaffer Landfill or other sources is unclear. Also, the source of the pesticides and PCBs found in fish tissue is unknown, though they appear to not be attributable to the Landfill.

The assessment also examined the potential adverse effect of erosion of the Landfill cap into the surrounding wetlands. As has been documented in the Phase 1C RI and earlier in this ROD, the creation and expansion of the Shaffer Landfill has been accompanied by the loss of wetlands. Wetlands inspections have shown that the Landfill cap, separate from expansion projects, has had erosion episodes into the surrounding wetlands, causing filling and thus loss of wetlands. The assessment concluded that proper construction and long-term maintenance of the side-slopes, surface drainage system, and erosion control facilities would be needed to minimize further loss of wetlands around the Landfill.

Conclusion

Consequently, the Shaffer Landfill remediation will strive to minimize actual or threatened releases of hazardous substances to the groundwater in order to achieve cleanup levels that are protective of human health and the environment and eliminate the Shaffer Landfill as a source of contamination to surface waters. Actual or threatened releases of hazardous substances in groundwater from the Landfill, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare or the environment.

The study and potential remediation of surface waters at Iron Horse Park as a whole, will be a part of the work conducted in the 3rd Operable Unit. The Remedial Investigation for the 3rd operable unit is expected to commence later this summer.

VII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. Statutory Requirements/Response Objectives

Under its legal authorities, EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with all federal and more stringent state environmental standards, requirements, criteria or limitations, unless a waiver is invoked; a requirement that EPA select a remedial action that

is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies in which treatment which permanently and significantly reduces the volume, toxicity or mobility of the hazardous substances is a principal element over remedies not involving such treatment. Response alternatives were developed to be consistent with these Congressional mandates.

Based on preliminary information relating to types of contaminants, environmental media of concern, and potential exposure pathways, remedial action objectives were developed to aid in the development and screening of alternatives. These remedial action objectives were developed to mitigate existing and future potential threats to public health and the environment. These response objectives are:

- **Prevent ingestion/direct contact with Landfill waste contamination.**

- **Prevent migration of contamination via leachate which would result in groundwater concentrations in excess of federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards.**

- **Prevent migration of contamination via leachate to surface waters and sediments to ensure that AWQCs are not exceeded due to the Landfill.**

- **Prevent damage and loss of wetlands caused by eroding soil from the Landfill cap, and meet all federal and state wetlands protection ARARs.**

- **Prevent ingestion of water having contamination in excess of federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards.**

- **Restore groundwater aquifer beyond the point of compliance to contaminant concentrations below federal MCLs, non-zero MCLGs, proposed MCLs and MCLGs, and Massachusetts Groundwater Quality Standards.**

B. Technology and Alternative Development and Screening

CERCLA and the NCP set forth the process by which remedial actions are evaluated and selected. In accordance with these requirements, a range of alternatives were developed for the site.

With respect to source control, the RI/FS developed a range of alternatives that involve little or no treatment but provide protection through engineering or institutional controls and a no action alternative.

With respect to the groundwater response action, the RI/FS developed a limited number of remedial alternatives that attain site specific remediation levels and a no action alternative.

As discussed in Chapter 4 of the Feasibility Study, the RI/FS identified, assessed and screened technologies based on implementability, effectiveness, and cost. These technologies were combined into source control (SC) and management of migration (MM) alternatives. Chapter 4 of the Feasibility Study presented the remedial alternatives developed by combining the technologies identified in the previous screening process in the categories identified in Section 300.430(e)(3) of the NCP. The purpose of the initial screening was to narrow the number of potential remedial actions for further detailed analysis while preserving a range of options. Each alternative was then evaluated and screened in Chapter 4 of the Feasibility Study. In summary, of the **6** source control and **5** management of migration remedial alternatives screened in Chapter 4, **4** source control and **4** management of migration remedial alternatives were retained for detailed analysis. These retained alternatives were then combined into developed alternatives which provide a range of overall effectiveness, implementability and protectiveness. These developed alternatives then underwent detailed analysis in Chapter 5 of the Feasibility Study. Table 4-5 in the FS identifies the **8** alternatives that were retained through the screening process, as well as those that were eliminated from further consideration. Table 4-6 in the FS identifies the developed alternatives which underwent detailed analysis in Chapter 5 of the Feasibility Study.

VIII. DESCRIPTION OF ALTERNATIVES

This Section provides a narrative summary of each alternative evaluated in the FS. The alternatives analyzed reference closure activities that have taken place pursuant to the Final Judgment entered into on June 12, 1984 between the Commonwealth of Massachusetts and the owners of the Landfill. The closure activities that have taken place to date include: construction

of a two layer cap which is comprised of a low permeability layer and topsoil vegetative layer, and installation of a gas collection/flare system. These closure activities are discussed more completely in Section 5.0 of the Phase 1C RI, and Section 2.0 of the Phase 1C FS. A tabular assessment of each alternative can be found in Table 4-6 of the Feasibility Study.

Alternatives Analyzed

The alternatives that underwent analysis for the Landfill include:

- No-Action Alternative (**Alternative 1**);
- A Landfill Cap Completion/Repair Alternative (**Alternative 2**);
- A Landfill Cap Completion/Repair with Leachate Collection Alternative (**Alternative 3**);
- A Landfill Cap Completion/Repair with Leachate Collection and Groundwater Extraction and Treatment Alternative (**Alternative 3A**);
- A Partial Reconstruction of Landfill Cap with Leachate Collection Alternative (**Alternative 4**);
- A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction and Treatment Alternative (**Alternative 4A**);
- A Total Reconstruction of Landfill Cap Alternative (**Alternative 5**) and;
- A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment Alternative (**Alternative 5A**).

Alternative 1: No-Action

This alternative was evaluated in detail in the Feasibility Study to serve as a baseline for comparison with the other remedial alternatives under consideration. Under this alternative, no treatment or containment of waste or leachate would occur and no effort would be made to restrict potential exposure to site contaminants.

Alternative 2: Landfill Cap Completion/Repair

This alternative would include:

- Repair of the top portions (approximately 16 acres) of

the existing cap on both sections of the Landfill by addition of fill, and regrading to achieve minimum 5% slopes followed by reconstruction of the low permeability and topsoil layers over those areas;

- Maintenance of cap, surface drainage system, and landfill gas collection/flare system. If necessary, improvements will be made;

- Monitoring of gas collection/flare system;

- Monitoring of groundwater and surface water quality, and;

- Construction of a site perimeter fence.

Under this alternative, the approximately 5 million cubic yards of waste would be contained.

Under this alternative as well as the other alternatives, EPA intends to initiate an off-site groundwater monitoring program in order to monitor and evaluate the effectiveness of the remedy, and to insure that the Tewksbury wellfield does not become contaminated due to the Shaffer Landfill. The placement of wells for the monitoring program, will be determined during the design process.

ESTIMATED TIME for DESIGN and CONSTRUCTION: 6 months
ESTIMATED PERIOD for OPERATION: 30 years
ESTIMATED CAPITAL COST: $1,330,000
ESTIMATED OPERATION and MAINTENANCE COST (net present worth): $901,000
ESTIMATED TOTAL COST (net present worth): $2,231,000

Alternative 3: Landfill Cap Completion/Repair with Leachate Collection

Alternative 3 contains the same features as Alternative 2 in terms of completion and maintenance of the Landfill cap and site security. In addition, Alternative 3 calls for:

- Improvements to the existing surface drainage system;

- Construction, operation, and maintenance of leachate collection facilities, and;

- Off-site treatment and disposal of leachate.

Implementation of the leachate collection toe drains may require excavation through refuse. If so, health and safety precautions for workers will be necessary. Erosion control

measures are also necessary during the toe drain construction for the protection of wetlands.

It is estimated that initially approximately 4600 gallons/day of leachate will be collected for off-site disposal. This estimate of leachate volume will be further refined during design. The volume of leachate is expected to decrease over time as the landfill is de-watered.

Section 121(d)(3) of CERCLA must be met for all materials shipped off-site.

ESTIMATED TIME for DESIGN and CONSTRUCTION: 1 year
ESTIMATED PERIOD for OPERATION: 30 years
ESTIMATED CAPITAL COST: $1,649,000
ESTIMATED OPERATION and MAINTENANCE COST (net present worth): $3,541,000
ESTIMATED TOTAL COST (net present worth): $5,190,000

Alternative 3A: Landfill Cap Completion/Repair with Leachate Collection and Groundwater Extraction and Treatment

Alternative 3A contains the same features as Alternative 3 in terms of completion and maintenance of the Landfill cap, improvements to the surface drainage system and leachate collection and treatment. In addition, Alternative 3A calls for:

- Construction, operation, and maintenance of a groundwater extraction system along the eastern side of the Landfill;

- Construction, operation, and maintenance of an on-site system for treatment of groundwater and leachate, and;

- Discharge of treated groundwater and leachate to surface water.

National Pollutant Discharge Elimination System (NPDES) requirements under the Clean Water Act are applicable to the discharge of treated water to surface water. Additional testing during the design phase is required for treatment plant design.

ESTIMATED TIME for DESIGN and CONSTRUCTION: 2 years
ESTIMATED PERIOD for OPERATION: 30 years
ESTIMATED CAPITAL COST: $8,842,000
ESTIMATED OPERATION and MAINTENANCE COST (net present worth): $4,310,000
ESTIMATED TOTAL COST (net present worth): $13,152,000

Alternative 4: Partial Reconstruction of Landfill Cap with Leachate Collection

Alternative 4 was EPA's preferred alternative in the January 15, 1991 Proposed Plan. This alternative consists of improvements to the Landfill cap, and collection, removal, treatment, and disposal of leachate. Alternative 4 calls for:

- Reconstruction of the top portions (approximately 16 acres) of the existing Landfill cap. This will improve its ability to prevent precipitation from leaching through the Landfill. Reconstruction would be achieved by removing the existing topsoil layer, adding fill and regrading to achieve a minimum 5% slope, installing additional low permeability material (either an additional 12-inches of soil with a maximum permeability of 1x10-7 cm/sec or a flexible membrane liner), installing a new 6-inch drainage layer, reinstalling the topsoil layer to a depth of 12-inches, and reseeding the disturbed areas;

- Improvements to the existing surface drainage system;

- Maintenance of cap, surface drainage system, and landfill gas collection/flare system. If necessary, improvements will be made;

- Monitoring of the gas collection/flare system;

- Monitoring of groundwater and surface water quality;

- Construction, operation, and maintenance of leachate collection facilities;

- Off-site treatment and disposal of leachate, and;

- Construction of a site perimeter security fence.

Implementation of the leachate collection toe drains may require excavation through refuse. If so, health and safety precautions for workers will be necessary. Erosion control measures are also necessary during the toe drain construction for the protection of wetlands.

It is estimated that initially approximately 4600 gallons/day of leachate will be collected for off-site disposal. This estimate of leachate volume will be further refined during design. The volume of leachate is expected to decrease over time as the Landfill is de-watered.

Section 121(d)(3) of CERCLA must be met for all materials shipped off-site.

ESTIMATED TIME for DESIGN and CONSTRUCTION: 1 year
ESTIMATED TIME for OPERATION: 30 years
ESTIMATED CAPITAL COST: $2,095,000
ESTIMATED OPERATION and MAINTENANCE COST (net present worth): $3,541,000
ESTIMATED TOTAL COST (net present worth): $5,637,000

Alternative 4A: Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction and Treatment

Alternative 4A includes all of the landfill cap reconstruction features, improvements to the surface drainage system, and leachate collection and treatment, which are also part of Alternative 4. In addition, Alternative 4A includes:

- Construction, operation, and maintenance of a groundwater extraction system along the eastern side of the Landfill;

- Construction, operation, and maintenance of an on-site system for treatment of groundwater and leachate, and;

- Discharge of treated groundwater and leachate to surface water.

National Pollutant Discharge Elimination System (NPDES) requirements under the Clean Water Act are applicable to the discharge of treated water to surface water. Additional testing during the design phase is required for treatment plant design.

ESTIMATED TIME for DESIGN and CONSTRUCTION: 2 years
ESTIMATED PERIOD for OPERATION: 30 years
ESTIMATED CAPITAL COST: $9,257,000
ESTIMATED OPERATION and MAINTENANCE COST (net present worth): $4,310,000
ESTIMATED TOTAL COST: $13,567,000

Alternative 5: Total Reconstruction of Landfill Cap

This alternative involves a complete reconstruction of the Landfill cap but does not include leachate collection and treatment. The components of Alternative 5 are:

- Reconstruction of the entire Landfill cap to meet EPA's recommended final cover design standards for hazardous waste landfills;

- Maintenance of cap and landfill gas collection/flare system. If necessary, improvements will be made;

- Monitoring of gas collection/flare system;

- Monitoring of groundwater and surface water quality, and;

- Construction of a site perimeter fence.

The cap reconstruction is extensive, and would include the following activities:

- Excavation of the existing vegetated topsoil;

- Temporary storage of the excavated soil;

- Removal of existing surface drainage facilities;

- Protection and raising of existing gas collection manholes;

- Regrading to establish required slopes;

- Upgrading the existing low permeability soil layer to achieve 24 inches of soil with a maximum permeability of 1 x10-7 cm/sec;

- Testing of the upgraded low permeability layer to assure design standards are achieved;

- Installation of a flexible membrane liner (FML) component directly above the upgraded low permeability soil layer;

- Installation of a soil drainage layer above the FML to drain the immediate and upgradient areas of the landfill;

- Installation of a geotextile filter between the drainage layer and upper vegetative layer;

- Installation of the vegetative support layer consisting of a minimum 24-inch layer of soil;

- Re-establishment of vegetative cover;

- Construction of required surface water runoff control facilities, and;

- Erosion control during construction activities

ESTIMATED TIME for DESIGN and CONSTRUCTION: 2 1/2 years
ESTIMATED PERIOD for OPERATION: 30 years
ESTIMATED CAPITAL COST: $12,799,000
ESTIMATED OPERATION and MAINTENANCE COST (net present worth): $901,000
ESTIMATED TOTAL COST (net present worth): $13,700,000

Alternative 5A: Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment

Alternative 5A contains all components of Alternative 5. In addition, Alternative 5A includes:

- Construction, operation, and maintenance of a groundwater extraction system along the eastern side of the landfill;

- Construction, operation, and maintenance of an on-site groundwater treatment system, and;

- Discharge of treated groundwater to surface water.

National Pollutant Discharge Elimination System (NPDES) requirements under the Clean Water Act are applicable to the discharge of treated water to surface water. Additional testing during design is required for treatment plant design.

ESTIMATED TIME for DESIGN and CONSTRUCTION: 2 1/2 years
ESTIMATED PERIOD for OPERATION: 30 years
ESTIMATED CAPITAL COST: $19,992,000
ESTIMATED OPERATION and MAINTENANCE COST (net present worth): $4,310,000
ESTIMATED TOTAL COST (net present worth): $24,302,000

IX. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

Section 121(b)(1) of CERCLA presents several factors that, at a minimum, EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the National Contingency Plan articulates nine evaluation criteria to be used in assessing the individual remedial alternatives.

A detailed analysis was performed on the alternatives using the nine evaluation criteria in order to select a site remedy. The following is a summary of the comparison of each alternative's strengths and weaknesses with respect to the nine evaluation criteria. These criteria and their definitions are as follows:

Threshold Criteria

The two threshold criteria described below must be met in order for the alternatives to be eligible for selection in accordance with the NCP.

1. **Overall protection of human health and the environment** addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced or controlled through treatment, engineering controls, or institutional controls.

2. **Compliance with Applicable or relevant and appropriate requirements (ARARS)** addresses whether or not a remedy will meet all of the ARARs of other Federal and State environmental laws and/or provide grounds for invoking a waiver.

Primary Balancing Criteria

The following five criteria are utilized to compare and evaluate the elements of one alternative to another that meet the threshold criteria.

3. **Long-term effectiveness and permanence** addresses the criteria that are utilized to assess alternatives for the long-term effectiveness and permanence they afford, along with the degree of certainty that they will prove successful.

4. **Reduction of toxicity, mobility, or volume through treatment** addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume, including how treatment is used to address the principal threats posed by the site.

5. **Short term effectiveness** addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved.

6. **Implementability** addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. **Cost** includes estimated capital and Operation Maintenance (O&M) costs, as well as present-worth costs.

Modifying Criteria

The modifying criteria are used on the final evaluation of remedial alternatives generally after EPA has received public comment on the RI/FS and Proposed Plan.

8. **State acceptance** addresses the State's position and key concerns related to the preferred alternative and other alternatives, and the State's comments on ARARs or the proposed use of waivers.

9. **Community acceptance** addresses the public's general response to the alternatives described in the Proposed Plan and RI/FS report.

A detailed narrative assessment of each alternative discussed in the FS according to the nine criteria can be found in Section 5 from page 5-5 to page 5-81 of the Feasibility Study.

Following the detailed analysis of each individual alternative, a comparative analysis, focusing on the relative performance of each alternative against the nine criteria, was conducted. This comparative analysis can be found in Table 5-11 of the Feasibility Study, and a more complete version that includes the selected remedy can be found in Appendix C of this ROD.

The section below presents the nine criteria and a brief narrative summary of the alternatives and the strengths and weaknesses according to the detailed and comparative analysis.

1. Overall Protection of Human Health and the Environment

Alternative 1 (No-action) does provide some limited protection since there is already a cap in place. However, as there is no perimeter security fence, and no operation and maintenance plan, any protection provided by this alternative would diminish over time. As a result, this alternative will never achieve reliable protection of human health and the environment.

Alternatives 2, 3, 3A, 4, 4A, 5, 5A, and the Selected Remedy all would provide some protection, but to varying degrees. In general, cap effectiveness and erosion protection increase from Alternative 2 to Alternatives 5 and 5A. The Selected Remedy is very close to Alternatives 5 and 5A in terms of cap effectiveness and erosion protection. The cap utilized in Alternatives 2, 3, and 3A provides improvements to the cap which is currently in place, specifically, by

increasing the grade on the top, flatter section of both the Residential and Commercial portions of the landfill (approximately 16 acres total). Alternatives 3 and 3A also call for improving the surface drainage system. The cap utilized in Alternatives 4 and 4A, further improves the cap performance by reducing permeability and adding a drainage layer thereby providing greater protection than Alternatives 2, 3, and 3A by reducing both infiltration through the Landfill, and erosion of the cap. The cap utilized in Alternatives 5 and 5A provides even greater overall protection by totally reconstructing the cap and installing a composite cap which meets EPA's recommended final cover design standards for hazardous waste landfills. The Selected Remedy calls for the reconstruction of the entire Landfill surface and the installation of an additional impermeable layer and a drainage layer over the entire 60 acres of the Landfill. These measures, while not involving the same degree of cap reconstruction as is required in Alternatives 5 and 5A, enable the Selected Remedy to very closely approach the overall protectiveness provided by Alternatives 5 and 5A. The increase in cap effectiveness in the alternatives considered generally provides an increasingly stable and permanent cap and so is accompanied by a decrease in the need for maintenance.

Alternatives 1, 2, and 5 contain no measures to provide additional protection regarding leachate or groundwater. Overall protection is enhanced in Alternatives 3, 3A, 4, 4A and the Selected Remedy by the addition of leachate collection, and in Alternatives 3A, 4A, and 5A by the addition of groundwater extraction and on-site treatment. Collection and treatment of leachate will greatly reduce the risk associated with the leachate and prevent further contamination of both groundwater and surface water from the Landfill due to leachate seeps. Groundwater treatment will eliminate the risk associated with contaminants in the groundwater east of the Landfill. Alternatives 3, 4, and the Selected Remedy call for leachate to be transported off-site for treatment and disposal and there is a risk associated with this transportation. This risk will be minimized by adherence to regulations governing the storing, handling, transporting, and manifesting of hazardous materials (leachate), if applicable.

2. **Compliance With Applicable or Relevant and Appropriate Requirements (ARARs)**

The Alternatives were evaluated for compliance with ARARs, including chemical-specific, action-specific, and location-specific ARARs. Alternatives 1 and 2 would not meet ARARs (MCLs and Massachusetts Groundwater Quality Standards). Alternatives 3, 3A, 4, 4A and the Selected Remedy would meet

all ARARs. Alternatives 3 and 4 would take considerably longer than the Selected Remedy to meet chemical-specific ARARs because the Selected Remedy has a much more effective cap. The addition of groundwater extraction and treatment in Alternatives 3A and 4A would significantly reduce the time before chemical-specific ARARs would be met. Alternatives 5 and 5A require the placement of a significant volume of fill material in wetlands and the floodplain. In doing so, these alternatives do not comply with wetlands and floodplain ARARs because there are other practicable alternatives to filling the wetlands and floodplains that would have a less adverse impact on the aquatic ecosystem and do not have other significant adverse environmental impacts.

3. **Long-term Effectiveness and Permanence**

Alternative 1 will probably never achieve reliable protection of human health and the environment. In addition, the effectiveness and permanence of Alternative 1 would be expected to diminish over time. Because there is a relatively unstable cap and no maintenance plan under this Alternative, an increase in the infiltration of water through the cap and waste material will result in an increasing flow of contaminants to groundwater and leachate. In addition, the cap itself will deteriorate over time exposing both the public and the environment to direct contact with the waste material. Finally, the magnitude of residual risk remaining at the Landfill is highest because this Alternative has the least effect on the volume, mobility and toxicity of contaminated leachate.

Alternative 2 provides increased long-term effectiveness and permanence through improvements to the cap, and the addition of an operation and maintenance plan and a site perimeter fence. Because this Alternative addresses neither leachate nor groundwater, the magnitude of residual risk is high. Alternative 3 contains the same cap, operation and maintenance plan, and fence improvements as Alternative 2, but provides additional effectiveness and permanence through improving the surface drainage system and the collection of leachate for off-site treatment and disposal. Improvements to the surface drainage system will enhance the permanence and reliability of the cap by reducing infiltration and erosion. Alternative 3A is identical to Alternative 3, but with the addition of a groundwater extraction and treatment system, and would provide the same degree of long-term effectiveness and permanence. The magnitude of the residual risk is smaller for Alternatives 3 and 3A than for Alternatives 1 and 2 because contaminants in groundwater and/or leachate have been addressed under these Alternatives.

Alternative 4 provides a more effective cap in terms of inhibiting water infiltration. In addition to the surface drainage system improvements which are also a part of Alternatives 3 and 3A, Alternative 4 contains a thicker vegetative layer, and a drainage layer beneath the vegetative layer. This drainage layer, coupled with the improvements to the surface drainage system, greatly enhance the permanence of the cap and further reduce the potential for erosion. Alternative 4 also contains the provision for collection of leachate for off-site treatment and disposal. Alternative 4A is identical to Alternative 4 with the exception that it adds a groundwater extraction and treatment system and would provide the same degree of long-term effectiveness and permanence. The magnitude of residual risk at the Landfill is smaller than Alternatives 1 and 2 because these Alternatives provide for collection and treatment of leachate and/or groundwater thereby reducing contaminants in these media to acceptable levels. In addition, the residual risk for these Alternatives is lower because the cap is more effective, thereby reducing the mobility and volume of contaminants to a greater extent than Alternatives 1 through 3.

The Selected Remedy provides the same type of cap construction as that contained in Alternative 4. However, long-term effectiveness and permanence are enhanced with the Selected Remedy by extending the coverage of the reconstructed cap to include the entire Landfill. Alternative 4 would reconstruct the cap over only the top 16 acres of the Landfill, while the Selected Remedy will cover the full 60 acres of the Landfill surface. Alternatives 1, 2, 3, 3A, 4, and 4A, all rely exclusively on the existing cap with regard to protection of the Landfill side-slopes. The Selected Remedy remediates side-slope deficiencies through reconstruction of the entire Landfill. Total coverage of the Landfill will provide an even more protective cap in terms of inhibiting water infiltration. The Selected Remedy calls for a drainage layer underlying the vegetative layer of the entire cap, and this layer, coupled with the rebuilt surface drainage system, further enhances the permanence of the cap and provides for additional protection against erosion. The Selected Remedy also contains the provision for collection of leachate for off-site treatment and disposal.

Alternative 5, through complete reconstruction of the cap, provides a high degree of permanence and effectiveness. The cap is very stable and greatly limits the infiltration of water. Alternative 5 does not contain provisions for the collection and treatment/disposal of leachate, so there is no reduction in the volume of residual waste remaining at the Landfill. Alternative 5A is identical to Alternative 5

with the exception that it includes a groundwater extraction and treatment system and therefore provides a high degree of reliability. The residual risk at the Landfill under this Alternative is the lowest of all Alternatives because contaminants in groundwater are treated to acceptable levels while this highly efficient cap greatly reduces the mobility of the remaining contaminants at the Landfill.

4. **Reduction of Toxicity, Mobility, or Volume Through Treatment**

Alternatives 1, 2, and 5, do not provide a reduction of toxicity, mobility, or volume through treatment. Alternatives 3, 4, and the Selected Remedy, reduce toxicity, mobility, and volume through treatment by collecting leachate and treating and disposing of it off-site. Alternatives 3A, 4A, and 5A, reduce toxicity, mobility, and volume through treatment by extraction and treatment of groundwater. In addition, Alternatives 3A, and 4A also contain a provision for leachate collection and treatment.

5. **Short-term Effectiveness**

There are no short-term impacts associated with Alternative 1 as there is no work involved in implementing this Alternative. With all the remaining Alternatives, the potential exists for erosion and associated damage to wetlands during landfill cap repair and reconstruction activities. Erosion control precautions would limit adverse impacts during implementation. The alternatives with leachate collection (Alternatives 3, 3A, 4, 4A, and the Selected Remedy) require excavation through areas of known leachate outbreak. Because of the potential risk associated with these activities, engineering precautions would be needed to minimize the risk of contaminant emissions and ensure short-term protection of workers, residents and the environment. The transportation of leachate off-site contained in Alternatives 3, 4, and the Selected Remedy involves some short-term risk. Alternatives 5, 5A, and the Selected Remedy require significant new cap material. As a result there would be significant daily truck traffic in the community throughout the relatively long implementation period of these Alternatives. Alternatives 1 and 2 would have no short term impact on the floodplain. Alternatives 3, 3A, 4, 4A, and the Selected Remedy would have short term impacts on the floodplain during limited construction activities which would need to take place within the floodplain. Implementation of Alternatives 5 and 5A would result in permanent loss of floodplain through extension of the base of portions of the Landfill in order to meet slope requirements.

6. **Implementability**

Except for Alternatives 5 and 5A, all alternatives retained for detailed analysis are technically and administratively implementable. In order to provide the necessary slope for the Landfill under Alternatives 5 and 5A, a portion of the Boston & Maine railroad tracks would be covered and wetlands and floodplains would be filled, making these alternatives technically and administratively difficult to implement. Alternatives 5 and 5A also present implementation concerns because they require the procurement, hauling, and handling of large volumes of materials necessary for cap reconstruction. The Selected Remedy would also require a significant volume of material although it requires less material than Alternatives 5 and 5A.

7. **Cost**

	Capital Costs	O&M Costs	Total Present Worth
Alternative 1	0	0	0
Alternative 2	$ 1,330,021	901,590	$ 2,231,611
Alternative 3	$ 1,648,729	3,541,426	$ 5,190,155
Alternative 3A	$ 8,841,772	4,310,090	$ 13,151,862
Alternative 4	$ 2,095,753	3,541,426	$ 5,637,179
Alternative 4A	$ 9,257,206	4,310,090	$ 13,567,296
Alternative 5	$12,798,759	901,590	$ 13,798,759
Alternative 5A	$19,991,802	4,310,090	$ 24,301,892
Selected Remedy	$ 9,012,098	3,541,426	$ 12,553,524

Additional information regarding costs for each alternative is located in Section 5.0 of the Feasibility Study.

8. **State Acceptance**

The Commonwealth of Massachusetts through the Department of Environmental Protection has concurred in the selection of this remedial action.

9. **Community Acceptance**

EPA received over 130 comments from Billerica residents, community organizations, and town officials regarding the

cleanup of the Shaffer Landfill. There was virtually unanimous support for choosing a remedy which provided for capping of the entire Landfill. There was also widespread support for the collection and treatment of leachate.

X. THE SELECTED REMEDY

EPA has selected a **comprehensive** remedy consisting of the following alternative.

The Selected Remedy is a modified version of Alternative 4. The design components of the Selected Remedy are very similar to Alternative 4, however the areal extent of the cap reconstruction will extend as much as feasible over the entire surface of the landfill. This is a substantial difference. Where Alternative 4 calls for approximately 16 acres of cap reconstruction, the Selected Remedy requires reconstruction of the entire 60 acres of Landfill surface. It is expected that the feasibility of extending this cap over the entire landfill may be limited in a minor way by steep side slopes.

EPA believes this remedy is comprehensive as it contains both source control and management of migration components and uses treatment to address the principal threat and engineering controls to address relatively low long term threats identified at the site. A detailed description of the cleanup levels and the Selected Remedy is presented below.

A. Interim Groundwater Cleanup Levels

Interim cleanup levels have been established in groundwater for all contaminants of concern identified in the baseline risk assessment found to pose an unacceptable risk to either public health or the environment. Interim cleanup levels have been set based on the appropriate ARARs (e.g. Drinking Water MCLGs and MCLs) if available, or other suitable criteria described below. Periodic assessments of the protection afforded by the remedial action will be made as the remedy is being implemented and at the completion of the remedial action. At the time that all the interim cleanup levels described below have been achieved, a risk assessment shall be performed on the residual groundwater contamination. This risk assessment of the residual groundwater contamination shall follow EPA procedures and will assess the cumulative risks for carcinogens and non-carcinogens posed by consumption of groundwater based upon knowledge of these risks at the time this risk assessment is conducted. If the risks are not within EPA's risk

management goal for carcinogens and non-carcinogens, then the remedial action will continue until protective levels are attained, or the remedy is otherwise deemed protective. Because the aquifer at the edge of the Landfill, the point of compliance, is classified as a Class II aquifer which is a potential source of drinking water (MADEP has classified this aquifer under the Massachusetts classification system as Class I groundwater, a source of potable water supply), MCLs and non-zero MCLGs established under the Safe Drinking Water Act are ARARs.

Interim cleanup levels for known and probable carcinogenic compounds (Class A and B) have been set at the appropriate MCL. The MCLG is set at zero for all Class A and B compounds and, therefore, is not used as a target cleanup level. The MCLG is nonzero for all other compounds. Cleanup levels for the Class C compounds (possible carcinogens) have been set at the MCLG.

Table I below summarizes the interim cleanup levels for carcinogenic and non-carcinogenic contaminants of concern identified in groundwater.

TABLE I: GROUNDWATER INTERIM CLEANUP LEVELS

Carcinogenic Contaminants of Concern (Class)	Cleanup Level (ppb)	Basis	Level Risk
Arsenic (A)	50	MCL[a]/risk mgt.[b]	2.0E-04
Benzene (A)	5	MCL	4.1E-06
1,2 Dichloroethane (B)	5	MCL	1.3E-05
Methylene Chloride (B)	5	pMCL[c]	1.0E-06
Pentachlorophenol (B)	1	pMCL	3.4E-06
1,1,2 Trichloro-ethane (C)	3	MCLG[d]	8.1E-06
Trichloroethylene (B)	5	MCL	1.6E-06
Vinyl Chloride (A)	2	MCL	1.3E-04

		Total Risk =	3.6E-04

a - Maximum Contaminant Level, Safe Drinking Water Act

b - The cleanup level for arsenic has been set at the MCL of 50 ppb. The carcinogenic risk posed by arsenic at 50 ppb in groundwater will approximate 2 in 1,000. However, in light of recent studies indicating that many skin tumors arising from oral exposure to arsenic are non-lethal and in light of the possibility that the dose-response curve for the skin cancers may be sublinear (in which case the cancer potency factor used to generate risk estimates will be overstated), it is Agency policy to manage these risks downward by as much as a factor of ten. As a result, the carcinogenic risks for arsenic at this Site have been managed as if they were 2 in 10,000. (See EPA memorandum, "Recommended Agency Policy on the Carcinogenic Risk Associated with the Ingestion of Inorganic Arsenic" dated June 21, 1988.)

c - Proposed Maximum Contaminant Level

d - Proposed Maximum Contaminant Level Goal

In the Baseline Risk Assessment, hazard indices greater than one were calculated for arsenic, benzene and vinyl chloride. Carcinogenic effects of these compounds are the overriding concern and cleanup levels have been set as shown in the above table.

These cleanup levels must be met at the completion of the remedial action at the point of compliance which is the edge of

the waste management unit (i.e. beyond the area where waste is left in place).

These cleanup levels are consistent with ARARs for groundwater and attain EPA's goal for remedial actions.

B. Description of Remedial Components

The remedy will consist of reconstruction of the entire landfill cap. What follows is a conceptual design only. Equal or more effective measures will be considered and may be incorporated into the final design. Reconstruction will be accomplished by:

1 - **Removing the existing topsoil layer exposing the existing in-place low-permeability soil;**

2 - **Raising gas collection well heads as necessary up to reconstructed cap surface level;**

3 - **Adding additional low-permeability soil;**

4 - **Grading of low-permeability soil to:**

a) Provide a 5% grade on the top of the landfill lobes, and

b) Provide a consistent smooth sub-grade on the landfill side slopes;

5 - **Installing an impermeable textured membrane liner over the entire landfill area;**

6 - **Installing a 6-inch drainage layer on top of the textured membrane liner over the entire landfill area;**

7 - **Installing a non-woven filter fabric between the drainage and topsoil layers;**

8 - **Reinstalling the topsoil layer and adding additional topsoil to achieve a topsoil depth of 12 inches;**

9 - **Reinstalling an upgraded surface drainage system;**

The surface drainage system will be designed during remedial design to optimize the removal of surface water from the landfill cap.

10 - **Reseeding of the disturbed areas.**

In areas where stability proves to be an engineering concern because of excessive side-slope incline, either a geo-grid or

crushed stone will be utilized in addition to the synthetic liner and in place of reseeding (i.e. vegetative cover) to provide adequate stability. It is estimated that this may effect approximately 2.5 of the 60 acres involved in the capping. The actual area affected will be determined during remedial design.

The remedy will also include:

- **Maintenance of cap, surface drainage system, and landfill gas collection/flare system. If necessary, improvements will be made based upon the protectiveness and effectiveness of these components;**

It is expected that over time the Landfill will experience surface subsidence. How much subsidence is expected, how much subsidence the cap, the surface drainage system, and the gas collection system can withstand, specifics regarding the frequency and requirements of inspections, and, corrective actions required, will be determined during remedial design.

- **Monitoring of the gas collection/flare system;**

EPA believes that the reconstructed landfill cap coupled with the maintenance of the gas collection/flare system will greatly mitigate or eliminate the odor and emission problems which have been associated with the Landfill. In addition, EPA believes that these improvements to the cap (and if necessary, gas collection/flare system) will eliminate any unacceptable risk from air emissions. The gas collection/flare system will be monitored to insure that public health and the environment are not at risk due to emissions from the Landfill. This long-term monitoring program will be established during remedial design, and will be designed to monitor Landfill emissions entering and exiting the flare system, and from components of the gas collection system. In addition, an air quality study will be undertaken to confirm that there is no risk to area residents or workers at the Landfill from exposure to airborne contaminants which were detected during air surveys conducted in 1990 or other contaminants which may be emitted from the Landfill in the future. EPA believes these emissions were the result of inadequacies in cap design as well as lack of adequate maintenance of the gas collection/flare system. To effectively conduct this study, the following shall, at a minimum, be required:

1. On and/or off-site meteorological station;

2. Sampling at the Landfill gas collection system manhole/manhole covers, at the entry and stack of the existing flare, at the Landfill perimeter and property boundaries, and at other removed sampling stations to determine amounts and concentrations of hazardous

Landfill gas emissions and to differentiate Landfill source contribution from background levels of contamination;

3. Approved sampling and analysis techniques suitable for quantitative risk evaluation;

4. Approved Quality Assurance/Quality Control Plan;

5. Sampling for air quality study to begin upon completion of cap reconstruction. Sample locations and methodology to be determined during design phase.

If EPA determines that residents or Landfill workers are at risk from exposure to emissions from the Landfill, EPA may also determine that additional treatment of gas emissions from the flare system or from the Landfill itself is necessary. If that is the case, EPA will consider an array of appropriate treatment technologies to treat these emissions. During cap reconstruction an approved Health and Safety Plan must be in place to insure that workers at the Landfill are protected from risk due to exposure to emissions from the Landfill.

- **Monitoring of groundwater and surface water quality;**

A long term monitoring program for groundwater and surface water quality will be designed and implemented. The intent of this program is to monitor the effectiveness of the remedy in meeting clean-up levels, to monitor the effectiveness of the remedy in preventing the migration of contamination to groundwater, to eliminate Shaffer Landfill as a source of contamination to surface water, and to insure that contamination from the Shaffer Landfill is not endangering or migrating towards the Tewksbury Municipal Wells. The design of the monitoring program, surface water sampling points, integrity of existing wells, the need for new wells, and sampling frequency, and the corrective action to be taken if the remedy is not effective will be determined during remedial design.

- **Construction, operation, and maintenance of leachate collection facilities;**

Leachate collection toe-drains will be sited above the water table and designed to collect the maximum volume of leachate feasible. Final design and siting of toe-drains will take place during remedial design. It was determined in the Floodplain Assessment that there is no practical alternative to locating the leachate storage tank within the 100-year floodplain. This will have a limited short-term impact on the floodplain because the leachate storage tank will be placed underground. Because of this, pre-construction grades and topography can be restored and there will be a minimal net loss of floodplain. Final sizing and

siting of leachate storage facilities will be accomplished during remedial design, and will be in accordance with applicable state and federal laws.

- **Off-site treatment and disposal of leachate;**

Collected leachate will be tested to determine treatment and disposal requirements. Route and method of transporting leachate off-site will be determined during pre-design.

- **Construction of site perimeter security fence;**

A site perimeter security fence will be constructed in order to prevent unauthorized access to the Landfill property. The specifications and design of the perimeter security fence will be determined during pre-design. Inspection of the fence condition and determination of its effectiveness in preventing access to the Landfill property, will be made a part of the operation and maintenance plan.

- **Institutional Controls, and;**

Institutional controls in the form of deed restrictions will be placed on the property to ensure that groundwater beneath the Landfill and within the contaminated groundwater plume will not be used for drinking water and that no activities will be conducted on the Landfill surface which compromise either the integrity of the cap, or the protection of human health and the environment.

- **Post Closure Plan**

A Post Closure Plan will be prepared during remedial design. This plan will encompass all operation and maintenance, monitoring, and inspection activities associated with the Landfill.

EPA will conduct a Statutory review of the Landfill at least once every five years after the initiation of remedial action at the Landfill to assure that the remedial action continues to protect human health and the environment. EPA may also evaluate risk posed by the Site at the completion of the remedial action (i.e., before the Site is proposed for deletion from the NPL).

XI. STATUTORY DETERMINATIONS

The remedial action selected for implementation at the Shaffer Landfill is consistent with CERCLA and, to the extent practicable, the NCP. The Selected Remedy is protective of human health and the environment, attains ARARs and is cost effective.

The selected remedy also satisfies the statutory preference for treatment which permanently and significantly reduces the mobility, toxicity or volume of hazardous substances as a principal element. Additionally, the Selected Remedy utilizes alternate treatment technologies or resource recovery technologies to the maximum extent practicable.

A. The Selected Remedy is Protective of Human Health and the Environment.

The remedy at this Site will permanently reduce the risks posed to human health and the environment by eliminating, reducing or controlling exposures to human and environmental receptors through treatment, engineering controls, **and** institutional controls.

Reconstruction of the Landfill cap will eliminate the potential for direct contact with refuse, providing protection of human health and the environment. The reconstructed cap, and more specifically the impermeable layer, the drainage layer, and the surface drainage system will greatly reduce the infiltration of water thru the refuse, thereby controlling the production of leachate and the migration of contamination to surface water and groundwater. The drainage layer and surface drainage system will serve to enhance the stability and permanence of the Landfill cap, preventing erosion of the cap itself and the migration of cap material into the surrounding wetlands. The site perimeter fence will prevent trespassing on-site, and, as a result, will eliminate potential erosion and exposure problems caused by unauthorized, uncontrolled site access. A leachate collection system will insure that contamination from the Landfill does not impact the groundwater or surface water due to leachate seeps. Treatment and disposal of leachate will provide a reduction of toxicity, mobility, and volume of contaminants remaining on-site.

Monitoring of the Landfill gas collection/flare system will insure that public health is not at risk from the emissions of the flare system or the Landfill. A study of air quality in the area, and an associated risk assessment will show any possible on-site and off-site risk which exists due to these emissions. This risk assessment, performed by EPA, will confirm that there is no risk which must be addressed in order for the remedy to be fully protective of human health and the environment.

A long-term monitoring program will insure that the Selected Remedy for the Landfill remains protective of human health and the environment. This program will include local groundwater monitoring and surface water monitoring in Richardson Pond and Content Brook. Institutional controls in the form of deed restrictions and groundwater use restrictions, will be used to control the future use of the Landfill. The institutional

controls will be focused on preventing the disturbance of the physical integrity of the components of the remedy, and preventing the use of groundwater beneath the Landfill and throughout the contaminated plume for drinking water. The Selected Remedy will meet groundwater clean-up levels and bring contaminant levels within the EPA established risk range by isolating the source of contamination with a highly impermeable cap, collecting contaminated leachate for treatment and disposal, and allowing groundwater contamination to naturally attenuate. Implementation of the Selected Remedy will achieve groundwater clean-up levels, and, by so doing, will reduce the carcinogenic and non-carcinogenic risks to human health to the goals required by EPA.

Finally, implementation of the Selected Remedy will not pose unacceptable short-term risks or cross-media impacts. The only disturbance to the Landfill cap during implementation will be for removal of the topsoil layer. During this time, engineering controls will be implemented to prevent cap erosion. The leachate collection toe-drains will be excavated through areas of known leachate outbreak. Because of the potential risk associated with these activities, strict engineering precautions would be needed to minimize the risk of contaminant emissions and insure short-term protection of workers, residents and the environment. Complying with RCRA and DOT regulations in the handling, transportation and disposal of leachate, if determined applicable, will minimize any short-term risk arising from these activities. The transportation of leachate off-site does present some short-term risk. Short-term risk will be minimized by adherence to applicable laws. The procurement of the large volume of material required for cap reconstruction, will have short-term impacts on the community mainly do to an increase in truck traffic involved in transporting cap materials.

B. The Selected Remedy Attains ARARs

This remedy will attain all applicable or relevant and appropriate federal and state requirements that apply to the Landfill. Environmental laws and regulations from which ARARs for the selected remedial action are derived and the specific ARARs include:

Chemical Specific

Safe Drinking Water Act (SDWA) - Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs) 40 CFR 141.11-141.16 and 40 CFR 141.50-141.52

Mass Groundwater Quality Standards - 314 CMR 6.00

Location - Specific

Clean Water Act (CWA) - 40 CFR part 230
Endangered Species Act - 16 U.S.C.1531 et seq; 50 CFR parts 81, 225, and 402
Executive Order 11990 - Protection of Wetlands
Executive Order 11988 - Floodplain Management
National Historic Preservation Act - 16 U.S.C.470; 7 CFR part 650
Massachusetts Wetlands Protection Law - 310 CMR 10.00
40 CFR Part 6, Appendix A
Massachusetts Hazardous Waste Regulations - Land Subject to Flooding - 310 CMR 30.701

Action - Specific

RCRA Hazardous Waste Regulations - Subtitle C

- Groundwater Monitoring
- RCRA Post Closure Care Requirements

Clean Air Act (CAA)

- National Ambient Air Quality Standards (NAAQS) for Seven Criteria Pollutants for Particulates - 40 CFR part 50
- National Emissions Standards for Hazardous Air Pollutants (NESHAPs) for Benzene - 40 CFR part 61

DOT Rules for Hazardous Materials Transport - 49 CFR parts 107, 171, and 172

Mass Hazardous Waste Regulations - 310 CMR 30.00
Massachusetts Ambient Air Quality Standards for Particulates - 310 CMR 6.00
Massachusetts Air Pollution Control Law - 310 CMR 7.00
Massachusetts Solid Waste Regulations - 310 CMR 19.00

To-Be-Considered

Massachusetts Air Toxics Program (May 1987)
Proposed MCLs and MCLGs

A more inclusive listing of ARARs can be found in Appendix D of this Record of Decision. This Table lists all potential ARARs identified for the Landfill and gives brief synopses of the ARARs and explanations of the actions necessary to meet the ARARs. The Table also indicates whether the ARARs are applicable or relevant and appropriate to actions at the Landfill. In addition to ARARs, the Table describes standards that are To-Be-Considered (TBC) with respect to remedial actions.

Major requirements at the Shaffer Landfill are discussed below.

1. Chemical - Specific Requirements

The groundwater aquifer at and beyond the compliance boundary of the Landfill is classified as Class IIB, a potential drinking water source. (MADEP has classified this aquifer under the Massachusetts classification system as Class I groundwater, a source of potable water supply.) SDWA MCLs and MCLGs are standards that apply to public water systems. Because the groundwater in the vicinity of the Landfill is classified as a potential drinking water source and not a public water system as defined by the SDWA, MCLs and MCLGs are relevant and appropriate rather than applicable, and proposed MCLs and MCLGs are To-Be-Considered.

2. Location - Specific Requirements

40 CFR Part 6, Appendix A, requires EPA to implement Executive Order 11988 (Floodplain Management) and Executive Order 11990 (Protection of Wetlands). To comply with Executive Order 11988, a remedial action must reduce the risk of flood loss and restore and preserve the natural and beneficial values served by floodplains. Executive Order 11990 requires EPA to minimize the destruction, loss or degradation of wetlands.

Portions of the Landfill lie within the 100-year floodplain. Wetlands are located immediately adjacent to portions of the Landfill. The Selected Remedy will result in minimal impacts to the wetlands and floodplain on and immediately adjacent to the site. Portions of the leachate collection system will be located within the 100-year floodplain in order to collect contaminated leachate and store it for treatment and disposal. The collection and storage tanks for leachate must be located within the 100-year floodplain in order to allow the collected contaminated leachate to flow into the tanks, via gravity for storage. There is no other practicable alternative to this construction. The Selected Remedy does not include any remedial activities in the adjacent wetlands. All on-site construction activities will be performed to minimize any potential impacts to the adjacent wetlands.

3. Action - Specific Requirements

EPA has determined that RCRA Subtitle C is not an applicable requirement because RCRA listed or characteristic hazardous waste has not been disposed of at the Landfill nor has any treatment, or storage of hazardous waste occurred at the Landfill since the effective date of RCRA Subtitle C.

Portions of RCRA Subtitle C are relevant and appropriate based on

current site specific information including: Groundwater Monitoring, Tanks, Contingency Plans and Emergency Procedures, Locational Standards and RCRA Post Closure Requirements. Contingency Plans and Emergency Procedures, Manifesting and Record Keeping, Tanks, Tank Closure and Locational Standards may be applicable to leachate collection and disposal depending on the results of leachate testing. The leachate will be tested to determine if any of the RCRA requirements, including land ban are applicable. The offsite leachate treatment and disposal must meet all Federal and State requirements. References to these provisions in Appendix D are to the State hazardous waste regulations that have been approved by EPA pursuant to RCRA.

C. The Selected Remedial Action is Cost-Effective

In the Agency's judgment, the Selected Remedy is cost effective, i.e., the remedy affords overall effectiveness proportional to its costs. In selecting this remedy, once EPA identified alternatives that are protective of human health and the environment and that attain, or, as appropriate, waive ARARs, EPA evaluated the overall effectiveness of each alternative by assessing the relevant three criteria--long term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short term effectiveness, in combination. The relationship of the overall effectiveness of this remedial alternative was determined to be proportional to its costs. The costs of this remedial alternative are:

Alternative	Capital Costs	O&M Costs	Total Present Worth
Alternative 1	0	0	0
Alternative 2	$ 1,330,021	901,590	$ 2,231,611
Alternative 3	$ 1,648,729	3,541,426	$ 5,190,155
Alternative 3A	$ 8,841,772	4,310,090	$ 13,151,862
Alternative 4	$ 2,095,753	3,541,426	$ 5,637,179
Alternative 4A	$ 9,257,206	4,310,090	$ 13,567,296
Alternative 5	$12,798,759	901,590	$ 13,798,759
Alternative 5A	$19,991,802	4,310,090	$ 24,301,892
Selected Remedy	$ 9,012,098	3,541,426	$ 12,553,524

Of the alternatives evaluated, both the Selected Remedy and Alternative 4 are considered to be cost effective with the Selected Remedy the most cost effective. The Selected Remedy provides benefits similar to Alternative 4, but greatly magnifies these benefits by extending the area of the Landfill cap reconstruction over the whole Landfill surface thereby providing a significantly more effective remedy. As a result, the Selected Remedy is the most cost effective in that its costs are most proportionate to the overall protection provided. Alternative 4 provides for a more stable, less permeable cap than currently exists, but only addresses 16 of the 60 total acres of Landfill surface, thereby providing significantly less overall effectiveness than the Selected Remedy. The Selected Remedy increases the stability of the cap provided in Alternative 4 particularly by addressing the stability and permanence of the side-slopes, greatly reducing the potential for infiltration of water, and reducing maintenance requirements.

D. The Selected Remedy Utilizes Permanent Solutions and Alternative Treatment or Resource Recovery Technologies to the Maximum Extent Practicable

Once the Agency identified those alternatives that attain or, as appropriate, waive ARARs and that are protective of human health and the environment, EPA identified which alternative utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. This determination was made by deciding which one of the identified alternatives provides the best balance of trade-offs among alternatives in terms of: 1) long-term effectiveness and permanence; 2) reduction of toxicity, mobility or volume through treatment; 3) short-term effectiveness; 4) implementability; and 5) cost. In accordance with the NCP, the balancing test emphasized long-term effectiveness and permanence and the reduction of toxicity, mobility and volume through treatment; and considered the preference for treatment as a principal element, the bias against off-site land disposal of untreated waste, and community and state acceptance. The Selected Remedy provides the best balance of trade-offs among the alternatives.

Alternatives 1, 2, 5, and 5A will not meet ARARs. In addition, Alternatives 1 and 2 are not protective of human health and the environment. Of the Alternatives remaining that meet ARARs and are protective, the Selected Remedy was chosen because its long-term effectiveness, permanence and ability to reduce toxicity, mobility, and volume of contaminants through treatment was most efficient with respect to implementability, short-term effectiveness and residual risk concerns. Because of the limited extent of the cap reconstruction, Alternatives 4 and 4A do not provide the same level of long-term effectiveness and permanence as the Selected Remedy. Alternatives 4 and 4A reduce toxicity,

mobility and volume through treatment, with 4A providing a greater level of reduction with the addition of a groundwater extraction and treatment system. However, this increase in treatment is accompanied by a significant increase in cost. Alternatives 3 and 3A each provide significantly less long-term effectiveness and permanence than the Selected Remedy, although Alternatives 3 and 3A do reduce toxicity, mobility and volume through treatment.

E. The Selected Remedy Satisfies the Preference for Treatment Which Permanently and Significantly reduces the toxicity, Mobility or Volume of the Hazardous Substances as a Principal Element

A principal element of the Selected Remedy is the collection and treatment and disposal of leachate. This element addresses partially the primary threat at the Site, contamination of groundwater. The Selected Remedy satisfies the statutory preference for treatment as a principal element by collecting, treating, and disposing of leachate.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

EPA presented a Supplement to the Proposed Plan for remediation of the Landfill on May 16, 1991. There are no significant changes from the Supplement to the Proposed Plan contained within this Record of Decision. It should be noted that some discrepancies in analysis exist between documents that comprise the Administrative Record, but that this Record of Decision represents EPA's final position with regard to these discrepancies. This position was reached after carefully reviewing and considering all information presented to EPA. Any discrepancies noted would not effect EPA's decision on the remedy.

XIII. STATE ROLE

The Commonwealth of Massachusetts, Department of Environmental Protection has reviewed the various alternatives and has indicated its support for the Selected Remedy. Massachusetts has also reviewed the Remedial Investigations, Endangerment Assessment and Feasibility Study to determine if the selected remedy is in compliance with applicable or relevant and appropriate State Environmental laws and regulations. The Commonwealth of Massachusetts concurs with the selected remedy for the Shaffer Landfill, Iron Horse Park Site. A copy of the declaration of concurrence is attached as Appendix F.

APPENDIX A

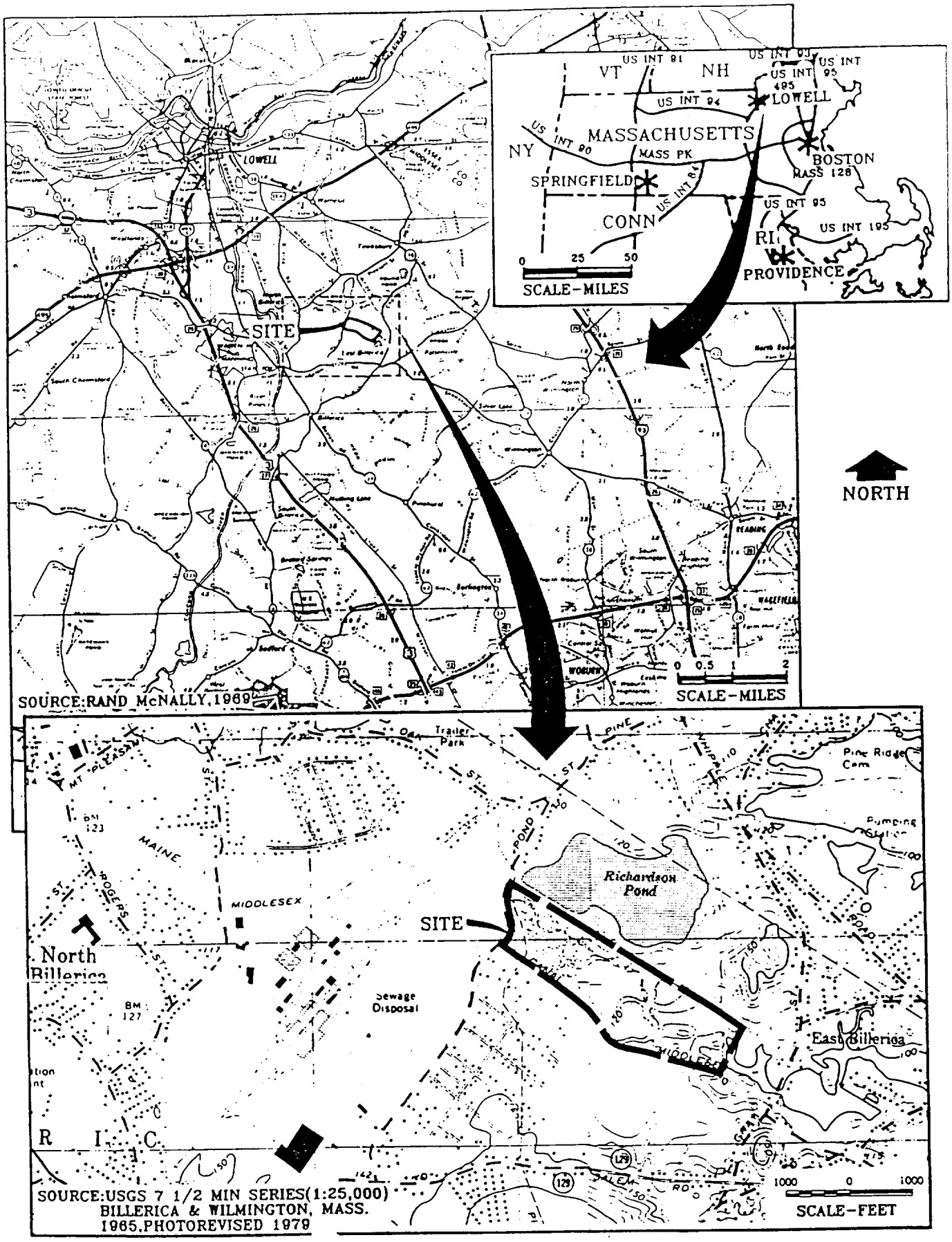


FIGURE 1 LOCATION MAP OF THE SITE

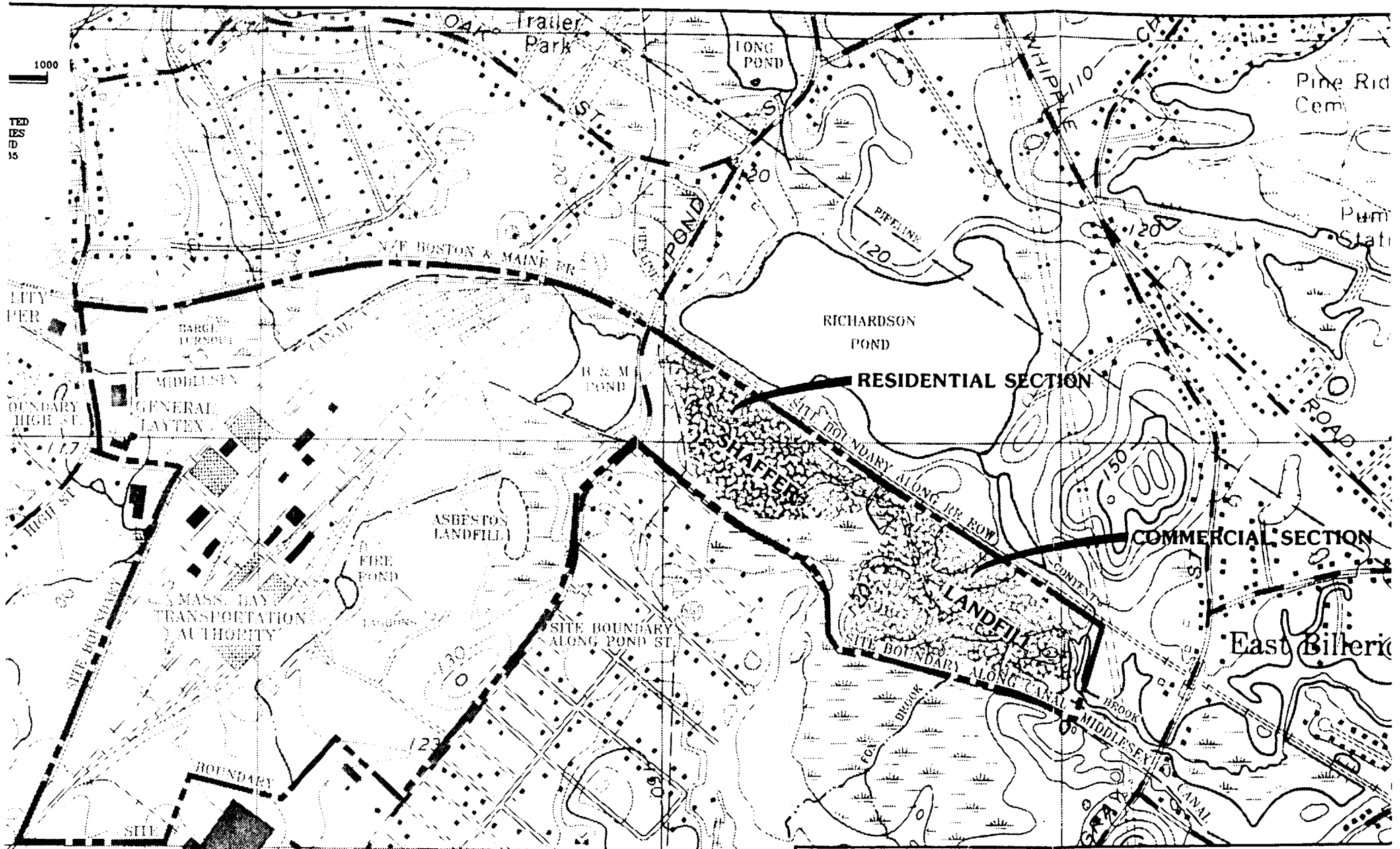
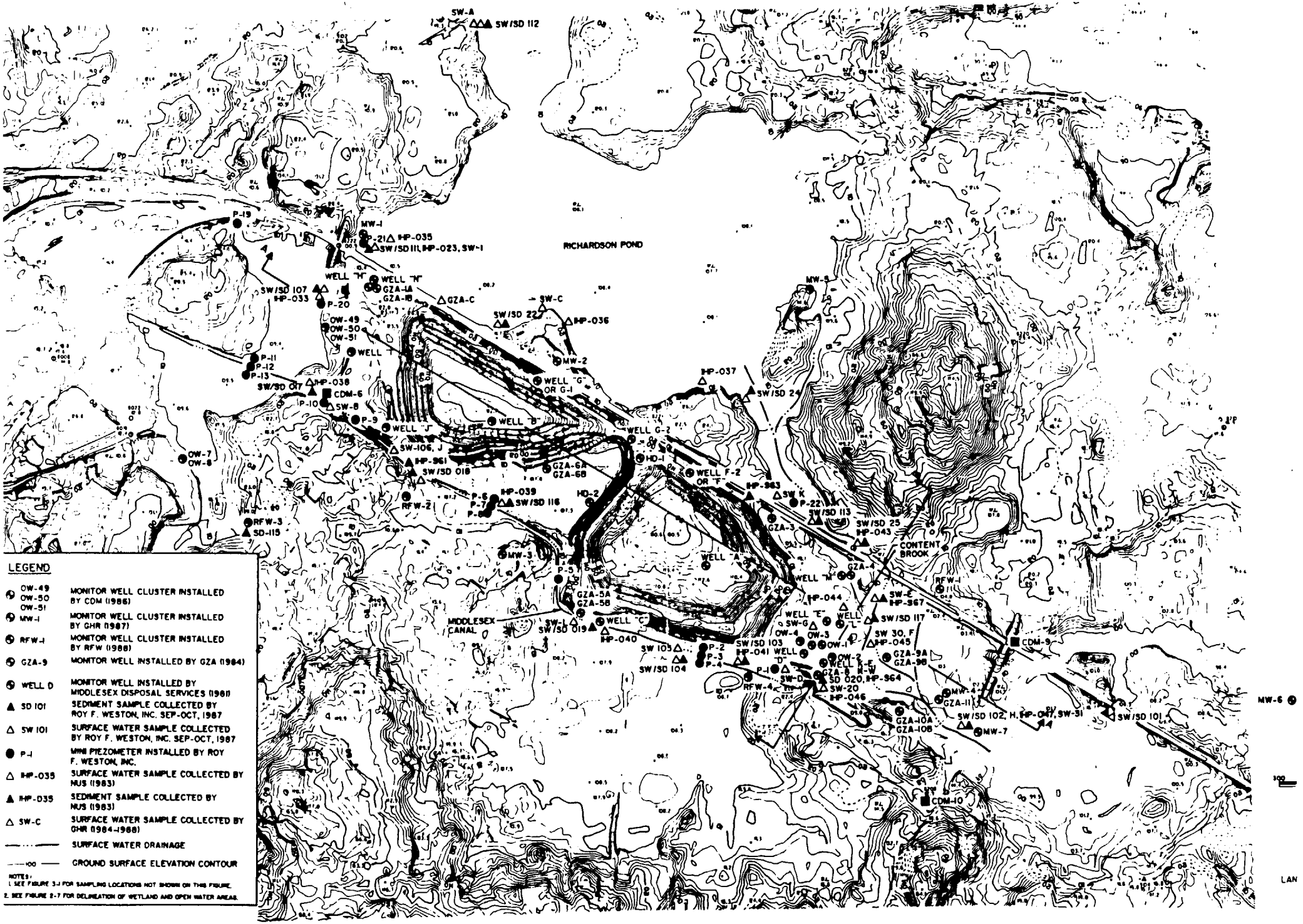


FIGURE 2

IRON HORSE PARK AND

SHAFFER LANDFILL SITE


RICHARDSON POND
MIDDLESEX CANAL
CONTENT BROOK
LEGEND
OW-49 OW-50 OW-51 MONITOR WELL CLUSTER INSTALLED BY COM (1986)
MW-1 MONITOR WELL CLUSTER INSTALLED BY GHR (1987)
RFW-1 MONITOR WELL CLUSTER INSTALLED BY RFW (1988)
GZA-9 MONITOR WELL INSTALLED BY GZA (1984)
WELL D MONITOR WELL INSTALLED BY MIDDLESEX DISPOSAL SERVICES (1981)
SD 101 SEDIMENT SAMPLE COLLECTED BY ROY F. WESTON, INC. SEP-OCT, 1987
SW 101 SURFACE WATER SAMPLE COLLECTED BY ROY F. WESTON, INC. SEP-OCT, 1987
P-1 MINI PIEZOMETER INSTALLED BY ROY F. WESTON, INC.
HP-035 SURFACE WATER SAMPLE COLLECTED BY NUS (1983)
HP-035 SEDIMENT SAMPLE COLLECTED BY NUS (1983)
SW-C SURFACE WATER SAMPLE COLLECTED BY GHR (1984-1988)
SURFACE WATER DRAINAGE
100 GROUND SURFACE ELEVATION CONTOUR
NOTES:
1. SEE FIGURE 3-1 FOR SAMPLING LOCATIONS NOT SHOWN ON THIS FIGURE.
2. SEE FIGURE 8-7 FOR DELINEATION OF WETLAND AND OPEN WATER AREAS.

CONTAMINANTS OF CONCERN

INORGANICS

Arsenic
Barium
Lead

ORGANICS

Benzene
1,2 Dichloroethane
Methylene Chloride
1,1,2 Trichloroethane
Trichloroethylene
Vinyl Chloride
1,4 Dichlorobenzene
1,2 Dichloroethene
Ethylbenzene
Toluene
Xylene
4,4' DDE
3,3' Dichlorobenzidene
PAH
Acetone
Benzoic Acid
2-Butanone
Pentachlorophenol
Di-n-octyl Phthalate
Di-n-butyl Phthalate
Butyl Benzyl Phthalate
Diethyl Phthalate
Bis (2-ethyl hexyl) Phthalate

TABLE A

CARCINOGENIC RISK FOR THE POTENTIAL FUTURE
INGESTION OF GROUND WATER AT THE LANDFILL PERIMETER

REASONABLE MAXIMUM EXPOSURE

Contaminant of Concern	Maximum Concentration (ug/l)	Cancer Potency (mg/kg/d)-1	Exposure Factor (l/kg/d)	Risk Estimate
Arsenic	2.58E+02	1.75E+00	2.90E-02	1.31E-02
Benzene	9.10E+01	2.90E-02	2.90E-02	7.65E-05
1,2 dichloroethane	5.50E+01	9.10E-02	2.90E-02	1.45E-04
Methylene chloride	5.00E+02	7.50E-03	2.90E-02	1.09E-04
1,1,2 trichloroethane	1.60E+01	5.70E-02	2.90E-02	2.64E-05
Trichloroethylene	6.10E+00	1.10E-02	2.90E-02	1.95E-06
Vinyl chloride	1.30E+02	2.30E+00	2.90E-02	8.67E-03
			TOTAL	2.2E-02

NOTE: Risk estimates are based on concentrations from one well and on cancer potency factors available in 1989.

Exposure Factor = 2 liters/day/70 kg body weight = .029 liters/kg/day

Risk Estimate = Concentration * Cancer Potency Factor * Exposure Factor

APPENDIX B

TABLE B

NON-CARCINOGENIC RISKS FOR THE POTENTIAL
FUTURE INGESTION OF GROUND WATER AT THE LANDFILL PERIMETER

REASONABLE MAXIMUM EXPOSURE

Contaminant of Concern	Maximum Concentration (ug/l)	Reference Dose(RfD) (mg/kg/d)	Exposure Factor (l/kg/d)	Hazard Index	Target Endpoint of Toxicity
Arsenic	2.58E+02	2.86E-03	2.90E-02	2.62E+00	keratosis
Barium	1.20E+03	5.70E-02	2.90E-02	6.11E-01	fetotoxicity/ incr. blood pressure
Benzene	9.10E+01	7.00E-04	2.90E-02	3.77E+00	fetotoxicity
1,4 dichlorobenzene	4.90E+01	1.00E-01	2.90E-02	1.42E-02	liver/kidney toxicity
1,2 dichloroethane	5.50E+01	7.43E-03	2.90E-02	2.15E-01	liver/kidney effects
1,2 dichloroethene	1.20E+02	1.00E-02	2.90E-02	3.48E-01	decreased hematocrit and hemoglobin
Ethylbenzene	3.50E+02	1.00E-01	2.90E-02	1.02E-01	liver and kidney toxicity
Methylene chloride	5.00E+02	6.00E-02	2.90E-02	2.42E-01	liver toxicity
Toluene	8.40E+02	3.00E-01	2.90E-02	8.12E-02	Central nervous system; respiratory irritant
1,1,2 Trichloroethane	1.60E+01	2.00E-01	2.90E-02	2.32E-03	clinical chemistry alteration
Trichloroethylene	6.10E+00	7.35E-03	2.90E-02	2.41E-02	liver/kidney effects
Vinyl chloride	1.30E+02	1.30E-03	2.90E-02	2.90E+00	liver
Xylene	1.50E+03	2.00E+00	2.90E-02	2.18E-02	decreased body weight

Hazard Indices for Similar Toxic Effects:

Keratosis	2.62E+00
Fetotoxicity	4.38E+00
Liver/Kidney Effect	5.96E-01
Hematocrit/hemoglobin change	3.48E-01

Exposure Factor = 2 liters/day/70 kg body weight = .029 liters/kg/day
Hazard Index = (Concentration * Exposure Factor)/RfD

NOTE: Risk estimates are based on concentrations from one well and on toxicity information available in 1989.

TABLE C

CARCINOGENIC RISKS FOR THE POTENTIAL FUTURE
INGESTION OF DOWNGRADIENT GROUND WATER

AVERAGE AND REASONABLE MAXIMUM EXPOSURE

Concern	AVG	MAX	(mg/kg/d)-1	(l/kg/d)	AVG	RME*
Bis(2-ethyl hexyl)phthalate	0.60	0.60	1.40E-02	2.90E-02	2.4E-07	2.4E-07
Pentachloro-phenol	29.00	110.00	1.20E-01	2.90E-02	1.0E-04	3.8E-04
Trichloro-ethylene	1.00	2.00	1.10E-02	2.90E-02	3.2E-07	6.4E-07
1,1,2 trichlor-oethane	2.60	3.00	5.70E-02	2.90E-02	4.3E-06	5.0E-06
				TOTAL	1.06E-04	3.89E-04

*Reasonable Maximum Exposure

Exposure Factor = 2 liters/day/70 kg body weight
Risk Estimate = Concentration * Exposure Factor * Cancer Potency Factor

TABLE D

NON-CARCINOGENIC RISKS FROM POTENTIAL FUTURE
INGESTION OF DOWNGRADIENT GROUND WATER

AVERAGE AND REASONABLE MAXIMUM EXPOSURES

Contaminant of Concern	Concentration AVG	Concentration MAX	Exposure Factor (l/kg/d)	Reference Dose(RfD) (mg/kg/day)	Hazard Index AVG	Hazard Index RME*	Target Endpoint of Toxicity
Barium	27.00	198.00	2.90E-02	5.70E-02	1.37E-02	1.01E-01	fetotoxicity/
Bis(2 ethylhexyl) phthalate	0.60	0.60	2.90E-02	2.00E-02	8.70E-04	8.70E-04	incr. blood pressure system; respiratory irritant
Pentachlorophenol	29.00	110.00	2.90E-02	3.00E-02	2.80E-02	1.06E-01	fetotoxicity
1,1,2 Trichloroethane	2.60	3.00	2.90E-02	2.00E-01	3.77E-04	4.35E-04	clinical chemistry alteration
Trichloroethylene	1.00	2.00	2.90E-02	7.35E-03	3.95E-03	7.89E-03	liver/kidney effects

Hazard Indices for similar toxic effects:

	AVG	MAX
Fetotoxicity	4.18E-02	2.07E-01
Liver/kidney	3.95E-03	7.89E-03
Blood	8.70E-04	8.70E-04
Clinical chemistry	3.70E-04	4.35E-04

* Reasonable Maximum Exposure

Exposure Factor = 2 liters/day/ 70 kg body weight
Hazard Index = (Exposure Factor * Concentration) / RfD

TABLE E

CARCINOGENIC RISKS FOR POTENTIAL PRESENT AND FUTURE
CONTACT WITH SEDIMENTS

AVERAGE AND REASONABLE MAXIMUM EXPOSURES

Contaminant of Concern	Concentration (mg/kg) AVG	MAX	Cancer Potency (mg/kg/d)-1	Exposure Factor (mg/kg/day)	Risk Estimate AVG	RME*
Arsenic	2.10E+01	8.20E+01	1.75E+00	1.26E-07	4.62E-06	1.80E-05
Benzene	3.00E-03	1.40E+02	2.90E-02	1.60E-07	1.39E-11	6.49E-07
Bis(2ethyl hexyl) phthalate	1.11E+00	5.10E+00	6.80E-04	1.60E-07	1.21E-10	5.54E-10
4,4' DDE	1.10E-02	6.70E-02	3.40E-01	1.60E-07	5.97E-10	3.64E-09
3,3'-Dichloro-benzidene	9.80E-02	9.80E-02	1.70E+00	1.60E-07	2.66E-08	2.66E-08
PAH(carcinogenic)	8.75E-01	1.23E+00	6.10	1.60E-07	8.53E-07	1.20E-06
				TOTAL:	5.50E-06	1.99E-05

Health risks from exposure to contaminated sediment are based on the following assumptions:

Exposed Population: Children aged 6 - 15 years
Exposure Frequency: 122 days/year
Exposure Duration: 10 years
Body Weight: 38 kg
Ingestion Rate:100 mg/day
Dermal Contact Rate: 1.5 mg/cm2
Absorption Factors
Dermal:
Organic Compounds: 0.02
Inorganic Compounds: 0.0
Ingestion: 1.0 (all compounds)

* Reasonable Maximum Exposure

Exposure Factor = ((SIR + DIR) * F * D)/ (BW * AT* 365)
Where: SIR = soil ingestion rate * absorption
DIR = dermal contact rate * absorption
F = frequency
D = duration
BW = body weight
AT = averaging time = 70 years

TABLE F

NONCARCINOGENIC RISK FOR THE POTENTIAL PRESENT
AND FUTURE EXPOSURE TO SEDIMENT

AVERAGE AND REASONABLE MAXIMUM EXPOSURES

Contaminant of Concern	Concentration (ug/kg) AVG	MAX	Reference Dose(RfD) (mg/kg/d)	Exposure Factor (mg/kg/d)	Hazard Index AVG	RME*	Toxic Effect
Acetone	7.10E+01	2.80E+02	1.00E-01	1.60E-07	1.13E-07	4.47E-07	Liver/kidney
Benzoic Acid	9.00E+02	1.50E+03	6.00E-02	1.60E-07	2.40E-06	3.99E-06	Irritation
Bis(2 ethylhexyl) phthalate	1.11E+03	5.10E+03	2.00E-02	1.60E-07	8.87E-06	4.07E-05	Liver
2-Butanone	1.50E+01	7.50E+01	5.00E-02	1.60E-07	4.79E-08	2.40E-07	CNS*/Fetotoxicity
Butyl benzyl phthalate	8.30E+01	1.40E+02	2.00E-02	1.60E-07	6.63E-07	1.12E-06	Body Wgt
4,4' DDE	1.10E+01	6.70E+01	5.00E-04	1.60E-07	3.51E-06	2.14E-05	Liver
3,3'-Dichoro-benzidene	9.80E+01	9.80E+01	8.00E-04	1.60E-07	1.96E-05	1.96E-05	Blood
Diethyl phthalate	1.00E+02	1.00E+02	1.30E+00	1.60E-07	1.23E-08	1.23E-08	Body wgt.
Di-n-butyl phthalate	1.32E+03	9.40E+03	2.00E-02	1.60E-07	1.05E-05	7.51E-05	Liver
Di-n-octyl phthalate	5.60E+01	5.60E+01	2.00E-02	1.60E-07	4.47E-07	4.47E-07	Liver
PAH(total)	8.81E+02	2.26E+03	4.00E-02	1.60E-07	3.52E-06	9.03E-06	Eye/lung
Xylene	1.10E+01	1.10E+03	4.40E-01	1.60E-07	3.99E-09	3.99E-07	CNS/intestine

Hazard Indices for Similar toxic effects:	AVG	MAX
Liver	2.35E-05	1.38E-04
CNS	5.19E-08	6.39E-07
Eye/lung	3.52E-06	9.03E-06
Blood	1.96E-05	1.96E-05
Other	3.07E-06	5.12E-06

Blood lead levels for lead were estimated to be 6.4 ug/DL

Exposure Factor = ((SIR + DIR) * F * D)/ (BW * AT* 365)

Where: SIR = soil ingestion rate * absorption
DIR = dermal contact rate * absorption
F = frequency
D = duration
BW = body weight
AT = averaging time = 70 years

Hazard Index = (Concentration * Exposure Factor)/RfD

* Reasonable Maximum Exposure

APPENDIX C

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-1 No Action	SC-2 Landfill Cap Completion/ Repair	SC-3 Landfill Cap Completion/ Repair with Leachate Collection	SC-3A Landfill Cap Completion/ Repair with Leachate Collection and Groundwater Extraction and Treatment
1. Short-term Effectiveness				
o Protection of community during remedial actions	No risks, since no remedial action.	Conventional construction techniques are not expected to produce adverse effects. Additional truck traffic will be required.	Conventional construction techniques are not expected to produce adverse effects. Additional minimal truck traffic will be required. Engineering precautions to reduce risk to community during installation of leachate collection toe drains.	Conventional construction techniques are not expected to produce adverse effects. Additional minimal truck traffic will be required. Engineering precautions to reduce risk to community during installation of leachate collection toe drains and groundwater extraction trenches.
o Potential impacts to workers during remedial actions, and the effectiveness and reliability of protective measures	No risks, since no remedial action.	Conventional construction techniques are not expected to produce adverse effects.	Conventional construction techniques are not expected to produce adverse effects, however, additional precautions are required for the installation of the leachate collection toe drains. These precautions are considered reliable and effective.	Conventional construction techniques are not expected to produce adverse effects, however, additional precautions are required for the installation of the leachate collection toe drains and groundwater extraction trenches. These precautions are considered reliable and effective.
o Environmental impacts and effectiveness and reliability of mitigative measures	No impacts since no remedial action.	Additional erosion control measures will be required to mitigate impacts to wetlands and surface waters during cap reconstruction and repair. These measures are considered reliable and effective.	Additional erosion control measures will be required to mitigate impacts to wetlands and surface waters during construction of leachate collection toe drains and cap. These measures are considered reliable and effective.	Additional erosion control measures will be required to mitigate impacts to wetlands and surface waters during construction of leachate collection toe drains and cap. These measures are considered reliable and effective.
o Time until protection achieved.	No action does not achieve the remedial response objectives.	6 months for implementation. Protection will not be achieved.	1 year for implementation. Protection will be achieved in a very long time period.	2 years for implementation. Protection will be achieved in a relatively long time period.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-1 No Action	SC-2 Landfill Cap Completion/ Repair	SC-3 Landfill Cap Completion/ Repair with Leachate Collection	SC-3A Landfill Cap Completion/ Repair with Leachate Collection and Groundwater Extraction and Treatment
2. Long-term Effectiveness and Permanence				
o Magnitude of remaining residual risk	If anticipated adverse effects reduce the cap's effectiveness, then on-going leachate generation will continue to degrade water quality. Residual risk very high.	Leachate strength would be expected to diminish somewhat over time due to reduced contaminant release from the combined effects of containment and biodegradation. Residual risk is still high.	With leachate collection, some additional long-term improvements in groundwater quality would be expected. Magnitude of residual risk smaller than Alternatives 1 and 2.	With leachate collection and groundwater extraction treatment system (GETS), this alternative is effective in mitigating leachate impacts to surface water and groundwater. Magnitude of residual risk smaller than Alternatives 1 and 2.
o Adequacy and reliability of controls	Without controls (i.e. corrective and preventive maintenance), erosion, settlement and frost action will continue to reduce the existing cap's effectiveness over time. Leachate collection and groundwater remediation have not been included.	Maintenance of the landfill's cap, surface drainage system, and gas collection/flare system, and construction of a site perimeter security fence are adequate and reliable controls to reduce leachate generation, landfill gas, and erosion. Leachate collection and active groundwater remediation have not been included.	Maintenance of the landfill's cap, surface drainage system, and gas collection/flare system, and construction of a site perimeter fence and leachate collection system are adequate and reliable controls to reduce leachate generation, landfill gas and erosion, and collect leachate. Drainage improvements also reduce erosion. Active groundwater remediation has not been included.	Maintenance of the landfill's cap, surface drainage system, and gas collection/flare system, and construction of a site perimeter fence, leachate collection system, and groundwater extraction treatment system are adequate and reliable controls to reduce leachate generation, landfill gas, and erosion, collect leachate, and treat groundwater. Drainage improvements also reduce erosion.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-1 No Action	SC-2 Landfill Cap Completion/ Repair	SC-3 Landfill Cap Completion/ Repair with Leachate Collection	SC-3A Landfill Cap Completion/ Repair with Leachate Collection and Groundwater Extraction and Treatment
3. Reduction of Toxicity, Mobility, or Volume				
o Treatment or recycling processes and remedy	No treatment, except for flaring landfill gas	No treatment, except for flaring landfill gas	Offsite treatment and disposal of collected leachate, and flaring of landfill gas.	Onsite treatment of collected leachate and extracted groundwater, and flaring of landfill gas.
o Amount of hazardous material destroyed, treated or recycled	None by treatment, however natural stabilization and attenuation takes place.	None by treatment, however natural stabilization and attenuation takes place.	Estimated 4600 gpd of leachate. Final volume determined during design.	Estimated 4600 gpd of leachate and 158,400 gpd of groundwater. Final volume determined during design.
o Degree of expected reduction in toxicity mobility or volume	Does not reduce mobility, toxicity or volume through treatment.	Does not reduce mobility, toxicity or volume through treatment.	Reduction of toxicity and/or volume is dependent on type of treatment which is dependent on leachate composition. Volume is estimated to be 4600 GPD of leachate.	Reduction of toxicity and/or volume is dependent on type of treatment which dependent on leachate and groundwater composition. Volume is estimated to be 4600 gpd of leachate and 158,400 gpd of groundwater.
o Irreversibility of the treatment	No treatment	No treatment	Irreversible	Irreversible
o Type and quantity of remaining treatment residuals	No treatment	No treatment	No residuals—offsite treatment.	Sludge from groundwater treatment to be disposed of offsite.
o Degree to which treatment reduces inherent hazards posed by principal threats	No treatment of hazards that pose principal threats.	No treatment of hazards that pose principal threats.	Treatment of leachate eliminates principal threat.	Treatment of leachate and groundwater eliminates principal threats.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-1 No Action	SC-2 Landfill Cap Completion/ Repair	SC-3 Landfill Cap Completion/ Repair with Leachate Collection	SC-3A Landfill Cap Completion/ Repair with Leachate Collection and Groundwater Extraction and Treatment
4. Implementability				
A. Technical Feasibility				
o Ability to construct and operate technology	No technology.	Fence construction, landfill repair, and regrading are easily implemented.	Fence construction, surface drainage improvements, landfill repair, and regrading are easily implemented. Construction of leachate collection system can be easily implemented with additional health and safety controls.	Fence construction, surface drainage improvements, landfill repair, and regrading are easily implemented. Construction of leachate collection system can be easily implemented with additional health and safety controls. Additional study is needed before implementation of the groundwater extraction system. Pilot testing is needed for design of the groundwater treatment system.
o Reliability of technology	No technology.	Reliable with proper maintenance.	Reliable with proper operation and maintenance.	Reliable with proper operation and maintenance.
o Ease of undertaking additional remedial action	Dependent upon the deterioration that takes place before additional actions are undertaken.	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.
o Monitoring effectiveness	No monitoring therefore not effective.	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-1 No Action	SC-2 Landfill Cap Completion/ Repair	SC-3 Landfill Cap Completion/ Repair with Leachate Collection	SC-3A Landfill Cap Completion/ Repair with Leachate Collection and Groundwater Extraction and Treatment
4. **Implementability** (Cont'd)				
B. Adminstrative Feasibility				
o Coordination with other agencies	No coordination.	Coordination with U.S.F. & W.S. and D.O.I. required.	Coordination with U.S.F. & W.S. and D.O.I. required.	Coordination with U.S.F. & W.S. and D.O.I. required.
o Ability and time to obtain approvals and permits	Not required.	Not required.	Not required.	Not required.
C. Availability of services and materials				
o Availability of adequate off-site treatment, storage capacity, and disposal capacity and services	None required.	None required.	Disposal of leachate can be contracted with a number of qualified commercial operators.	Leachate and sludge disposal can be contracted with a number of qualified commercial operators.
o Availability of equipment and specialists prospective technologies, provisions to ensure additional resources.	None required.	Equipment readily available.	Equipment readily available.	Equipment readily available. Groundwater extraction treatment system will be built to specification after a pilot study.
o Availability of services and materials	None required.	Services and materials are readily available.	Services and materials are readily available.	Services and materials are readily available.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-1 No Action	SC-2 Landfill Cap Completion/ Repair	SC-3 Landfill Cap Completion/ Repair with Leachate Collection	SC-3A Landfill Cap Completion/ Repair with Leachate Collection and Groundwater Extraction and Treatment
5. Cost				
o Capital cost	No costs.	$1,330,021	$1,648,729	$8,841,772
o Operation and Maintenance Cost - present worth		$901,590	$3,541,426	$4,310,090
o Total		$2,231,611	$5,190,155	$13,151,862
6. Compliance with ARAR's				
o Chemical specific ARAR's	Continuing violation of MCLs and Massachusetts Groundwater Quality Stds. will result from leachate contaminating surface and groundwaters.	Continuing violation of MCLs and Massachusetts Groundwater Quality Stds. will result from leachate contaminating surface and groundwaters.	Will be met after a very long time period. Future violation of MCL's and Massachusetts Groundwater Quality Stds. is unlikely with leachate collection, and natural attenuation of surface and groundwaters.	Will be met after a relatively long time period. Future violation of MCL's and Massachusetts Groundwater Quality Stds. is unlikely with leachate and groundwater collection and treatment.
o Location specific ARAR's	Not applicable.	Alternative meets all location specific ARARs.	Alternative meets all location specific ARARs.	Alternative meets all location specific ARARs.
o Action-specific ARAR's	Not applicable.	Alternative will comply with all pertinent regulations.	Alternative will comply with all pertinent regulations.	Alternative will comply with all pertinent regulations.
o Compliance with criteria, advisories and guidances	Alternative will not meet proposed MCLs and MCLGs.	Alternative will not meet proposed MCLs and MCLGs.	Alternative will meet proposed MCLs and MCLGs after a very long time period.	Alternative will meet proposed MCLs and MCLGs after a relatively long time period.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-1 No Action	SC-2 Landfill Cap Completion/ Repair	SC-3 Landfill Cap Completion/ Repair with Leachate Collection	SC-3A Landfill Cap Completion/ Repair with Leachate Collection and Groundwater Extraction and Treatment
7. Overall Protection of Human Health and Environment				
o Risks are eliminated, reduced or controlled	Some limited protection since landfill containment eliminates contact with refuse, and reduces some leachate generation. No overall protection regarding leachate and groundwater.	Operation and maintenance provides a sustained level of protection over Alternative 1. Landfill containment eliminates contact with refuse, and reduces some leachate generation. Potential physical hazard to trespassers, and potential erosion of wetlands is mitigated by a security fence. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration. No overall protection regarding leachate and groundwater.	A leachate collection system provides a greater degree of protection over Alternative 2 as leachate generation will be further reduced. Offsite transport of leachate produces a minor risk of contaminant release which can be controlled by compliance with D.O.T. regulations. Landfill containment eliminates contact with refuse, and reduces some leachate generation. Potential physical hazard to trespassers, and potential erosion of wetlands is mitigated by a security fence. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration.	A GETS captures and treats the contaminants that reach groundwater and treats those collected by the leachate collection system providing increased protection over Alternatives 1, 2 and 3. Compliance with NPDES requirements protects surface water quality. Landfill containment eliminates contact with refuse, and reduces some leachate generation. Potential physical hazard to trespassers, and potential erosion of wetlands is mitigated by a security fence. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-4 Partial Reconstruction of Landfill Cap with Leachate Collection	SC-4A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction Treatment	SC-5 Total Reconstruction of Landfill Cap	SC-5A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment	Selected Remedy Landfill Cap Reconstruction with Leachate Collection
1. Short-term Effectiveness					
o Protection of community during remedial actions	Construction activities pose minimal public health risks. Additional truck traffic may minimally impact the community. Engineering precautions to reduce risk to community during construction of leachate collection toe drain.	Construction activities pose minimal public health risks. Additional truck traffic may minimally impact the community. Engineering precautions to reduce risk to community during construction of leachate collection toe drains and groundwater extraction trenches.	Construction activities pose minimal public health risks. Significant truck traffic will be associated with this alternative.	Construction activities pose minimal public health risks. Significant truck traffic will be associated with this alternative.	Construction activities pose minimal public health risks. Significant truck traffic will be associated with this remedy. Engineering precautions to reduce risk to community during construction of leachate collection toe drain.
o Potential impacts to workers during remedial actions, and the effectiveness and reliability of protctive measures	Conventional construction techniques are not expected to produce adverse effects, however, additional precautions are required for the installation of the leachate collection toe drains. These precautions are considered reliable and effective.	Conventional construction techniques are not expected to produce adverse effects, however, additional precautions are required for the installation of the leachate collection toe drains and groundwater extraction trenches. These precautions are considered reliable and effective.	Conventional construction techniques are not expected to produce adverse effects.	Conventional construction techniques are not expected to produce adverse effects, however, additional precautions are required for the installation of the groundwater extraction trenches.	Conventional construction techniques are not expected to produce adverse effects, however, additional precautions are required for the installation of the leachate collection toe drains. These precautions are considered reliable and effective.
o Environmental impacts and effectiveness and reliability of mitigative measures	Construction activities will reduce the effectiveness of the existing cap during implementation which could have a negative impact on adjacent wetlands and water bodies absent mitigative measures. Erosion controls are required to maintain the existing soil layer covering the refuse and should be reliable and effective.	Construction activities will reduce the effectiveness of the existing cap during implementation which could have a negative impact on adjacent wetlands and water bodies absent mitigative measures. Erosion controls are required to maintain the existing soil layer covering the refuse and should be reliable and effective.	Construction of 3:1 slopes requires significant wetlands to be filled and covered. Strict erosion control measures are required to mitigate impacts to wetlands and surface water bodies but will still result in significant adverse impact on wetlands.	Construction of 3:1 slopes requires significant wetlands to be filled and covered. Strict erosion control measures are required to mitigate impacts to wetlands and surface water bodies but will still result in significant adverse impact on wetlands.	Construction activities will reduce the effectiveness of the existing cap during implementation which could have a negative impact on adjacent wetlands and water bodies absent mitigative measures. Erosion controls are required to maintain the existing soil layer covering the refuse and should be reliable and effective.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-4 Partial Reconstruction of Landfill Cap with Leachate Collection	SC-4A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction Treatment	SC-5 Total Reconstruction of Landfill Cap	SC-5A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment	Selected Remedy Landfill Cap Reconstruction with Leachate Collection
o Time until protection achieved	1 year for implementation. Time until protection is achieved is less than Alternatives 1,2, and 3.	2 years for implementation. Time until protection is achieved is less than Alternatives 1,2,3, 3A and 4.	2 1/2 years for implementation. Time until protection is achieved may be relatively long.	2 1/2 years for implementation. Time until protection is achieved is probably less than all other alternatives.	2 years for implementation. Time until protection is achieved is less than Alterantives 1,2,3, and 4.
2. Long-term Effectiveness and Permanence					
o Magnitude of remaining residual risk	Improvement of the cap's effectiveness will further reduce leachate generation and strength and with leachate collection groundwater quality is expected to improve. Residual risk is less than Alternatives 1 and 2.	Improvement of the cap's effectiveness will further reduce leachate generation and strength. Leachate collection and groundwater treatment systems will mitigate leachate impacts to surface water and groundwater. Residual risk is less than Alternatives 1,2,3, and 4.	The reconstructed cap will be most effective in reducing leachate generation and strength to a minimum. No reduction in volume of residual waste remaining.	The reconstructed cap will be most effective in reducing leachate generation and strength to a minimum. The GETS provides improved long-term effectiveness in mitigating leachate impacts to surface water and groundwater. Magnitude of residual risk is lower than Alternatives 1,2,3, and 4.	Improvement of the cap's effectiveness will further reduce leachate generation and strength and with leachate collection groundwater quality is expected to improve. Residual risk is less than Alternatives 1 and 2.
o Adequacy and reliability of controls	Modifications to the cap should reduce leachate generation, increase the reliability and decrease maintenance requirements. The improved surface drainage system, vegetative cover, and site perimeter security fence will minimize erosion. Because of these improvements, this Alternative is more reliable than Alternatives 1,2,3 and 3A. A leachate collection system provides adequate control of the limited leachate generated. Active Groundwater remediation has not been included.	Modifications to the cap should reduce leachate generation, increase the reliability and decrease maintenance requirements. The improved surface drainage system, vegetative cover, and site perimeter security fence will minimize erosion. Because of these improvements, this Alternative is more reliable than Alternatives 1,2,3, and 3A. A leachate collection system provides adequate control of the limited leachate generated. A GETS provides control in mitigating potential leachate impacts.	Modifications to achieve the most stable landfill cap and on-going maintenance will reduce leachate generation most effectively over other alternatives. However, leachate collection and groundwater remediation have not been included and there is some question as to the overall reliability in achieving acceptable groundwater protection.	The addition of GETS provides greatest overall long-term effectiveness in combination with the most stable landfill cap.	Reconstruction will provide a highly stable cap, reducing leachate generation, increasing reliability, and decreasing maintenance requirements. The improved surface drainage system, drainage layer, vegetative cover, and site perimeter fence will reduce erosion. Because of these improvements, this cap is more reliable than Alternatives 1, 2, 3, 3A, 4, and 4A and is almost equivalent to Alternatives 5 and 5A. A leachate collection system provides adequate control of the limited leachate generated. Active Groundwater remediation has not been included.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-4 Partial Reconstruction of Landfill Cap with Leachate Collection	SC-4A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction Treatment	SC-5 Total Reconstruction of Landfill Cap	SC-5A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment	Selected Remedy Landfill Cap Reconstruction with Leachate Collection
3. Reduction of Toxicity, Mobility, or Volume					
o Treatment or recycling processes and remedy	Offsite treatment and disposal of collected leachate, and flaring of landfill gas.	Onsite treatment of collected leachate and extracted groundwater, and flaring of landfill gas.	No treatment, except for flaring landfill gas.	Onsite treatment of extracted groundwater, and flaring of landfill gas.	Offsite treatment and disposal of collected leachate, and flaring of landfill gas.
o Amount of hazardous material destroyed, treated or recycled	Estimated 4600 gpd of leachate. Final volume determined during design.	Estimated 4600 gpd of leachate and 158,400 gpd of groundwater. Final volume determined during design.	None by treatment, however natural stabilization and attenuation takes place.	Estimated 158,400 gpd of groundwater. Final volume determined during design.	Estimated 4600 gpd of leachate. Final volume determined during design.
o Degree of expected reduction in toxicity mobility or volume	Reduction of toxicity and/or volume is dependent on type of treatment which is dependent on leachate composition. Volume is estimated to be 4600 gpd of leachate.	Reduction of toxicity and/or volume is dependent on type of treatment which is dependent on leachate and groundwater composition. Volume is estimated to be 4600 gpd of leachate and 158,400 gpd of groundwater.	Does not reduce mobility, toxicity, or volume through treatment.	Reduction of toxicity and/or volume is dependent on type of treatment which is dependent on groundwater composition. Volume is estimated to be 158,400 gpd of groundwater.	Reduction of toxicity and/or volume is dependent on type of treatment which is dependent on leachate composition. Volume is estimated to be 4600 gpd of leachate.
o Irreversibility of the treatment	Irreversible	Irreversible	No treatment	Irreversible	Irreversible
o Type and quantity of remaining treatment residuals	No residuals—offsite treatment.	Sludge from groundwater treatment to be disposed of offsite.	No treatment	Sludge from groundwater treatment to be disposed of offsite.	No residuals—offsite treatment.
o Degree to which treatment reduces inherent hazards posed by principal threats	Treatment of leachate eliminates principal threat.	Treatment of leachate and groundwater eliminate principal threats.	No treatment.	Treatment of groundwater eliminates threat.	Treatment of leachate eliminates principal threat.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-4 Partial Reconstruction of Landfill Cap with Leachate Collection	SC-4A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction Treatment	SC-5 Total Reconstruction of Landfill Cap	SC-5A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment	Selected Remedy Landfill Cap Reconstruction with Leachate Collection
4. Implementability					
A. Technical Feasibility					
o Ability to construct and operate technology	Fence construction, surface drainage improvements, landfill reconstruction and regrading are easily implemented. Construction of leachate collection system can be easily implemented with additional health and safety controls. Difficulties arise in (1) modifying in and around existing gas collection system manholes, (2) re-establishing vegetation, and (3) controlling erosion.	Fence construction, surface drainage improvements, landfill reconstruction and regrading are easily implemented. Construction of leachate collection system can be easily implemented with additional health and safety controls. Additional study is needed before implementation of the groundwater extraction system. Pilot testing on groundwater composition is needed for design of the treatment system. Difficulties arise in (1) modifying in and around existing gas collection system manholes, (2) re-establishing vegetation, and (3) controlling erosion.	Fence construction and landfill reconstruction are easily implemented. Difficulties arise in (1) modifying in and around existing gas collection system manholes, (2) re-establishing vegetation, and (3) controlling erosion.	Fence construction and landfill reconstruction are easily implemented. Additional study is needed before implementation of the groundwater extraction system. Pilot testing on groundwater composition is needed for design of the treatment system. Difficulties arise in (1) modifying in and around existing gas collection system manholes, (2) re-establishing vegetation, and (3) controlling erosion.	Fence construction, surface drainage improvements, landfill reconstruction and regrading are easily implemented. Construction of leachate collection system can be easily implemented with additional health and safety controls. Difficulties arise in (1) modifying in and around existing gas collection system manholes, (2) re-establishing vegetation, and (3) controlling erosion.
o Reliability of technology	Adherence to quality control during installation will ensure a reliable cap with proper operation and maintenance.	Adherence to quality control during installation will ensure a reliable cap with proper operation and maintenance.	Adherence to quality control during reconstruction will ensure the most reliable cap.	Adherence to quality control during reconstruction of the cap and installation of the GETS will ensure a highly reliable system. Cap is the most reliable.	Adherence to quality control during installation will ensure a highly reliable cap with proper operation and maintenance.
o Ease of undertaking additional remedial action	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.	Cap design should not interfere with any future remedial action. Future cap repair should be a simple operation.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-4 Partial Reconstruction of Landfill Cap with Leachate Collection	SC-4A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction Treatment	SC-5 Total Reconstruction of Landfill Cap	SC-5A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment	Selected Remedy Landfill Cap Reconstruction with Leachate Collection
4. **Implementability** (Cont'd)					
o Monitoring effectiveness	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.	Monitoring involves periodic visual inspection of the cap, sampling surface and groundwater downgradient of the landfill, and monitoring the gas collection/flare system. This should be adequate to monitor effectiveness.
B. Adminstrative Feasibility					
o Coordination with other agencies	required.	required.	in the cap toe impinging on adjacent wetlands and the B&M railroad tracks. Coordination with U.S.F. & W.S. and D.O.I. are required.	in the cap toe impinging on adjacent wetlands and the B&M railroad tracks. Coordination with U.S.F. & W.S. and D.O.I. are required.	required.
o Ability and time to obtain approvals and permits	Not required.	Not required.	Possibly extensive due to encroachment on wetlands and issues related to railroad tracks.	Possibly extensive due to encroachment on wetlands and issues related to railroad tracks.	Not required.
C. Availability of services and materials					
o Availability of adequate off-site treatment, storage capacity, and disposal capacity and services	Disposal of leachate can be contracted with a number of qualified commercial operators.	Leachate and sludge disposal can be contracted with a number of qualified commercial operators.	None required.	Sludge disposal can be contracted with a number of qualified commercial opertors.	Disposal of leachate can be contracted with a number of qualified commercial operators.
o Availability of equipment and specialists and prospective technologies, provisions to ensure additional resources	Equipment readily available.	Equipment readily available. GETS will be built to specificaiton after a pilot study.	Equipment readily available. Procuring, hauling, and handling of the additional required soil materials will be significant.	Equipment readily available. GETS will be built to specification after a pilot study. Procuring, hauling, and handling of the additional required soil materials will be significant.	Equipment readily available. Procuring, hauling, and handling of the additional required soil materials will be significant.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-4 Partial Reconstruction of Landfill Cap with Leachate Collection	SC-4A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction Treatment	SC-5 Total Reconstruction of Landfill Cap	SC-5A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment	Selected Remedy Landfill Cap Reconstruction with Leachate Collection
4. Implementability (Cont'd)					
o Availability of services and materials	Services and materials are readily available.	Services and materials are readily available.	Procurement of cap materials will be significant.	Procurement of cap materials will be significannt.	Services are readily available. Procurement of cap materials will be significant.
5. Cost					
o Capital cost	$2,095,753	$9,257,206	$12,798,759	$19,991,802	$9,012,098
o Operation and Maintenance Cost - present worth	$3,541,426	$4,310,090	$901,590	$4,310,090	$3,541,426
o Total	$5,637,179	$13,567,296	$13,700,349	$24,301,892	$12,553,524
6. Compliance with ARAR's					
o Chemical-specific ARAR's	Alternative will meet chemical specific ARARs in less time than Alternatives 1, 2, and 3 with improved cap and leachate collection and natural attenuation of surface and groundwaters.	Alternative will meet chemical specific ARARs in less time than Alternatives 1,2,3,3A and 4 with improved cap and leachate and groundwater collection and treatment.	Alternative will meet chemical specific ARARs with the reconstructed landfill cap reducing leachate generation to a minimum. Time to meet may be relatively long.	Alternative will meet chemical specific ARARs with the reconstructed landfill cap reducing leachate generation to a minimum and groundwater treatment. Time to meet is probably less than all other Alternatives.	Remedy will meet chemical-specific ARARs in less time than Alternatives 1,2,3, and 4 with reconstructed cap, leachate collection, and natural attenuation of surface and groundwaters.
o Location-specific ARAR's	Alternative meets all location specific ARARs.	Alternative meets all location specific ARARs.	Significant volumes of fill material in wetlands violates wetland regulations.	Significant volumes of fill material in wetlands violates wetland regulations.	Remedy meets all location-specific ARARs.
o Action-specific ARAR's	Alternative will comply with all regulations.	Alternative will comply with all regulations.	Alternative will comply with all regulations.	Alternative will comply with all regulations.	Remedy will comply with all regulations.
o Compliance with criteria, advisories and guidances	Alternative will meet in less time than Alternatives 1, 2, and 3.	Alternative will meet in less time than Alternatives 1,2,3, 3A and 4.	Alternative will meet. Time to meet may be relatively long.	Alternative will meet. Time to meet is probably less than all other Alternatives.	Remedy will meet in less time than Alternatives 1,2,3, and 4.

COMPARISON OF SOURCE CONTROL ALTERNATIVES

Criteria	SC-4 Partial Reconstruction of Landfill Cap with Leachate Collection	SC-4A Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction Treatment	SC-5 Total Reconstruction of Landfill Cap	SC-5A Total Reconstruction of Landfill Cap with Groundwater Extraction and Treatment	Selected Remedy Landfill Cap Reconstruction with Leachate Collection
7. Overall Protection of Human Health and Environment					
o Risks are eliminated, reduced or controlled	Landfill cap reconstruction further reduces leachate generation over Alternatives 1-3A. A leachate collection system controls contaminant release. These two measures provide further protection of groundwater. Offsite transport of leachate produces a minor risk of contaminant release which can be controlled by compliance with D.O.T. regulations. Reconstruction provides more stable cap than Alternatives 1-3A, preventing erosion into wetlands. Landfill containment eliminates contact with refuse. Potential physical hazard to trespassers, and potential erosion into wetlands is mitigated by a security fence. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration.	Landfill cap reconstruction further reduces leachate generation over Alternatives 1-3A. A GETS captures and treats the contaminants that reach groundwater and treats those collected by the leachate collection system providing increased protection over Alternatives 1-4. These measures provide further protection of groundwater. Compliance with NPDES requirements protects surface water qualitiy. Landfill containment eliminates contact with refuse. Potential physical hazard to trespassers, and potential erosion of wetlands is mitigated by a security fence. Reconstruction provides more stable cap than Alternatives 1-3A, preventing erosion into wetlands. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration.	The reconstructed landfill cap is the most effective in reducing leachate generation over Alternatives 1-4A and the selected remedy. Landfill containment eliminates contact with refuse. Potential physical hazard to trespassers, and potential erosion of wetlands is mitigated by a security fence. Total reconstruction provides most stable cap, preventing erosion into wetlands. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration.	The reconstructed landfill cap is the most effective in reducing leachate generation over Alternatives 1-4A and the selected remedy. A GETS captures and treats the contaminants that reach groundwater. Compliance with NPDES requirements protects surface water quality. Landfill containment eliminates contact with refuse. Potential physical hazard to trespassers, and potential erosion of wetlands is mitigated by a security fence. Total reconstruction provides most stable cap, preventing erosion into wetlands. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration.	Landfill cap reconstruction further reduces leachate generation over Alternatives 1-4A and is almost equal to Alternatives 5 and 5A. A leachate collection system controls contaminant release. These two measures provide further protection of groundwater. Offsite transport of leachate produces a minor risk of contaminant release which can be controlled by compliance with D.O.T. regulations. Landfill containment eliminates contact with refuse. Potential physical hazard to trespassers, and potential erosion into wetlands is mitigated by a security fence. Reconstruction provides more stable cap, preventing erosion into wetlands better than Alternatives 1, 2, 3, 3A, 4, and 4A. Landfill gas collection/flare system controls release of airborne contaminants. Groundwater monitoring warns of offsite migration.

APPENDIX D

POTENTIAL ARARS AND CRITERIA, ADVISORIES AND GUIDANCE FOR THE REMEDIAL ALTERNATIVE
FOR THE SHAFFER LANDFILL, IRON HORSE PARK SITE, BILLERICA, MASSACHUSETTS

REQUIREMENT	APPLICABLE	RELEVANT APPROPRIATE	RATIONALE	HOW ARAR IS MET
I. CHEMICAL-SPECIFIC				
A. FEDERAL REQUIREMENTS				
1. SDWA-Maximum Contaminant Levels (MCLs) and non-zero maximum contaminant level goals (MCLGs) 40 CFR 141.11-141.16 and 141.50-141.52		X	MCLs and MCLGs have exceeded in groundwater. Groundwater is potential drinking water source.	Capping will reduce infiltration and subsequent migration of contaminants into groundwater so that MCLs and non-zero MCLGs will be met. Leachate collection will enhance remediation time.
2. Proposed MCLs and Non-Zero MCLGs	To Be Considered		Proposed MCLs and MCLGs have been exceeded in groundwater. Groundwater is potential drinking water source.	Capping will reduce infiltration and subsequent migration of contaminants into groundwater so that proposed MCLs and MCLGs will be met. Leachate collection will enhance remediation time.
B. STATE REQUIREMENTS				
1. Groundwater Quality Standards (314 CMR 6.00)	X		Groundwater Quality Standards have been identified for a number of contaminants detected in groundwater. When the state levels are more stringent than the federal levels, the state levels will be used.	Capping will reduce infiltration and subsequent migration of contaminants into groundwater so that standards will be met. Leachate collection will enhance remediation time.
II. LOCATION-SPECIFIC				
A. FEDERAL REQUIREMENT				
1. Clean Water Act (CWA) (40 CFR Part 230)	X		This requirement prohibits the discharge of dredged or fill material into a wetland.	Alternative will not impact wetlands as no dredged or fill material will be discharged to the wetland.
2. Endangered Species Act (16 USC 1531 et seq) (50 CFR Parts 81, 225 and 402)	X		Endangered Species Act was enacted to conserve endangered species. Consultation with the Department of Interior may be required if the site provides critical habitat upon which endangered or threatened species depend.	DOI has been consulted with and no endangered or threaten species have been identified at the Site.
3. Wetlands Executive Order (EO 11990) (40 CFR 6 Appendix A)	X		Federal agencies are required to minimize the destruction, loss or degradation of wetlands and preserve and enhance natural and beneficial value of wetlands.	No activities conducted in wetlands. All on-site construction performed to minimize impacts to adjacent wetlands.

POTENTIAL ARARS AND CRITERIA, ADVISORIES AND GUIDANCE FOR THE REMEDIAL ALTERNATIVE
FOR THE SHAFFER LANDFILL, IRON HORSE PARK SITE, BILLERICA, MASSACHUSETTS

REQUIREMENT	APPLICABLE	RELEVANT APPROPRIATE	RATIONALE	HOW ARAR IS MET
4. Floodplains Executive Order (EO 11988) (40 CFR 6 Appendix A)	X		Federal Agencies are required to reduce the risk of flood loss, to minimize impact of floods and to restore and preserve the natural and beneficial value of floodplains.	Construction of leachate collection facilities in floodplains is necessary due to lack of available land area and floodplain proximity to landfill. There are no practicable alternatives. All construction will be performed to minimize potential harm to floodplains.
5. National Historic Preservation Act (16 U.S.C. 470; 7 CFR Part 650)	X		Middlesex Canal is adjacent to Shaffer Landfill and listed on the National Register of Historic Places. Consultation with State Historic Preservation Officer is required to ensure that no adverse effects to cultural resources take place.	Massachusetts Historical Commission has been consulted and concurred with EPA determination of no adverse effect from remedial action.
B. STATE REQUIREMENTS				
1. DEP - Wetlands Protection (310 CMR 10.00)	X		These regulations are promulgated under Wetlands Protection Laws, which regulate dredging, filling, altering or polluting inland wetlands. Work within 100 feet of a wetland is regulated under this requirement. Regulations also define wetlands based on vegetation type and requires that effects on wetlands be mitigated. Includes regulation of work in bordering land subject to flooding.	Work will be performed according to state requirements so that general performance standards are met for regulated resource areas. If necessary, alternative will provide for replacement of bordering vegetated wetlands and compensatory storage for lost flood volume storage.
2. DEP Hazardous Waste Regulation (310 CMR 30.00)				
a. Land Subject to flooding (310 CMR 30.701)	X	X	This regulation requires hazardous waste facilities located in a 100 year floodplain to be designed, constructed, operated and maintained to prevent washout, or that no adverse effects on human health or the environment will result if washout occurs. Leachate will be tested to determine if requirements are applicable.	Leachate collection system will be designed, constructed, operated, and maintained to comply with floodplain requirements.
III. ACTION-SPECIFIC				
FEDERAL REQUIREMENTS				
1. Clean Air Act (42 USC 7401)				
a. National Ambient Air Quality Standards (NAAQS) for Seven Criteria Pollutants (40 CFR Part 50)		X	Remedial alternative includes earth moving, stockpiling and spreading operations that may result in dust and particulate releases.	Alternative will include air monitoring to confirm compliance with relevant and appropriate standards. All affected areas will employ dust control measures during implementation and maintenance of the remedy to prevent violation of standards.

POTENTIAL ARARS AND CRITERIA, ADVISORIES AND GUIDANCE FOR THE REMEDIAL ALTERNATIVE
FOR THE SHAFFER LANDFILL, IRON HORSE PARK SITE, BILLERICA, MASSACHUSETTS

REQUIREMENT	APPLICABLE	RELEVANT APPROPRIATE	RATIONALE	HOW ARAR IS MET
b. National Emissions Standards for Hazardous Air Pollutants (NESHAPs) (40 CFR 61)		X	Benzene has been detected in emissions at gas vents.	Alternative will include air monitoring to confirm compliance with relevant and appropriate standards. If necessary, improvements will be made to achieve standards.
2. DOT Rules for Hazardous Materials Transport (49 CFR Parts 107, 171, 1-171.500)	X		Remedial alternative includes off-site transport of leachate. Leachate will be tested to see if applicable.	Alternative will comply with DOT rules if applicable.
3. Hazardous Waste Regulations (RCRA Subtitle C, 40 CFR Part 264)				
a. Groundwater Protection (264.97 - 264.99).		X	Site includes landfill that is leaching.	Alternative will include groundwater monitoring.
b. RCRA Closure and Post Closure Care Requirements (40 CFR 264 Subpart G)	X	X	Remedial alternative includes landfill and tank.	Alternative will comply with relevant and appropriate post-closure requirements for landfill and alternative closure will comply with requirements for tanks, if applicable.
B. STATE REQUIREMENTS				
1. DEP Hazardous Waste Regulation (310 CMR 30.00)	X			
a. Tanks (310 CMR 30.690 - .699)	X	X	Remedial alternative includes leachate collection involving storage tanks. Leachate will be tested to determine if applicable.	Alternative will comply with regulations.
b. Contingency Plan, Emergency Procedures, preparedness and prevention (310 CMR 30.520 - 524)	X	X	Remedial alternative includes landfill closure and leachate collection.	Alternative will include a contingency plan and emergency procedures, etc.
c. Manifesting, Record Keeping and Reporting (30.310 - 30.340)	X		Remedial alternative includes shipments of leachate for off-site disposal. Leachate will be tested to determine if applicable.	Alternative will include required manifesting, record keeping and reporting if applicable.
d. Transporters (310 CMR 30.400 - .416)	X			

POTENTIAL ARARS AND CRITERIA, ADVISORIES AND GUIDANCE FOR THE REMEDIAL ALTERNATIVE
FOR THE SHAFFER LANDFILL, IRON HORSE PARK SITE, BILLERICA, MASSACHUSETTS

REQUIREMENT	APPLICABLE	RELEVANT APPROPRIATE	RATIONALE	HOW ARAR IS MET
2. DEP - Mass Air Toxics Program (May 1987)	To Be Considered		Affected contaminants have been detected in emissions at gas vents.	Alternative will include air monitoring and modelling to assess significance of contamination. If necessary, improvements will be made to ensure attainment of guidelines.
3. DEP - Mass Ambient Air Quality Standards (310 CMR 6.04)		X	To ensure that emissions from a source will not adversely affect any of the Ambient Air Quality Standards for 7 criteria pollutants.	Air emissions will be evaluated to determine attainment and if necessary, measures will be taken to ensure these standards are met.
4. DEP - Mass Air Pollution Control Standards (310 CMR 7.00)			Remedial alternative includes air emissions controls.	Alternative will include air monitoring to confirm compliance with relevant and appropriate standards. If necessary, improvements will be made to achieve standards.
5. DEP - Mass Solid Waste Regulations (310 CMR 19.00)				
a. Landfill final cover system (310 CMR 19.112)	X		Includes requirements for the cover for the landfill.	The alternative will meet the requirements of this section.
b. Alternative landfill final cover system design (310 CMR 19.113)	X		Provides for an alternative design for the final cover than is specified in the regulations.	Design of cover will adequately protect public health, safety and the environment.
c. Storm water controls (310 CMR 19.115)	X		To prevent erosion, discharge of pollutants, and protect physical integrity of the landfill	Alternative will include storm water controls that meet these requirements.
d. Surface and groundwater protection (310 CMR 19.116)	X		To prevent direct discharge of contaminated run-off or leachate.	Alternative will prevent run-off and discharge of leachate.
e. Air quality protection systems (310 CMR 19.117)	X		To control concentrations of explosive and malodorous gases to maintain air quality.	Alternative will include methods to control and monitor gases that will meet these requirements.
f. Groundwater, surface water and air monitoring systems (310 CMR 19.118)	X		To detect and quantify release of contaminants to the ground, groundwater surface water or air.	Alternative will include monitoring to meet these requirements.
g. Landfill gas recovery operations (310 CMR 19.121 (4))	X		Operation and maintenance of gas recovery system.	Alternative will include operation and maintenance that will meet these requirements.
h. Leachate collection, treatment and disposal (310 CMR 19.130 (30))	X		Requirements for leachate collection and disposal.	Alternative includes leachate collection and disposal that will meet these requirements.

POTENTIAL ARARS AND CRITERIA, ADVISORIES AND GUIDANCE FOR THE REMEDIAL ALTERNATIVE FOR THE SHAFFER LANDFILL, IRON HORSE PARK SITE, BILLERICA, MASSACHUSETTS

REQUIREMENT	APPLICABLE	RELEVANT APPROPRIATE	RATIONALE	HOW ARAR IS MET
i. Environmental monitoring requirements (310 CMR 19.132)	X		Monitoring shall be included to evaluate effectiveness of the remedy.	Alternative will include monitoring that will meet these requirements.
j. Landfill post closure requirements (310 CMR 19.142)	X		Monitor to ensure integrity of closure measures.	Alternative will include monitoring that will meet these requirements.
k. Post closure use of landfills (310 CMR 19.143)	X		The landfill shall not be used for any other use without prior written approval of the Department.	The alternative includes institutional controls.

APPENDIX E

Responsiveness Summary for the Iron Horse Park-Shaffer Landfill Superfund Site, Billerica, MA

Preface

The U.S. Environmental Protection Agency (EPA) held a 60-day public comment period from January 16, 1991 to March 16, 1991 to provide an opportunity for interested parties to comment on the Remedial Investigation (RI), Endangerment Assessment (EA), Feasibility Study (FS), and the Proposed Plan prepared for the Shaffer Landfill section of the Iron Horse Park Superfund Site in Billerica, Massachusetts (the Site). EPA made a preliminary recommendation of its preferred alternative for site remediation in the Proposed Plan issued on January 15, 1991 before the start of the comment period. On May 16, 1991, EPA issued a Supplement to the Proposed Plan which recommended a new preferred alternative for site remediation. EPA held an additional 30-day public comment period from May 17, 1991 to June 17, 1991.

The purpose of this Responsiveness Summary is to document EPA responses to the comments and questions raised during the public comment periods. EPA will consider all of the comments summarized in this document before selecting a final remedial alternative to address contamination at the Site.

This responsiveness summary contains the following sections:

I. Overview of Remedial Alternatives Considered in the Feasibility Study and Proposed Plan - This section briefly outlines the remedial alternatives evaluated in the FS and Proposed Plan, including EPA's preliminary recommendation of a preferred alternative.

II. Site History and Background on Community Involvement and Concerns - This section provides a brief site history and a general overview of community interests and concerns regarding the Site.

III. Summary of Comments Received During the Public Comment Period and EPA Responses to these Comments - This section summarizes and provides EPA responses to comments received from residents and other interested parties during the public comment period. In addition, comments received from the Potentially Responsible

Parties (PRPs) and the Massachusetts Department of Environmental Protection (MADEP) are summarized and EPA's responses to these comments are provided.

Attachment A - This attachment provides a list of the community relations activities that EPA has conducted to date at the Site.

Attachment B - This attachment provides a transcript of the February 5, 1991 and February 19, 1991 informal public hearings on the site, both of which were held in Billerica, Massachusetts.

All written comments received by EPA during the comment periods are contained in the Administrative Record for Shaffer Landfill, which can be reviewed at:

EPA Records Center
90 Canal Street, 1st Floor
Boston, Massachusetts 02114

OR

Billerica Public Library
25 Concord Road
Billerica, MA 01821

I. Overview of Remedial Alternatives Considered in the Feasibility Study and Proposed Plan

On January 16, 1991, EPA released a Proposed Plan for the Shaffer Landfill portion of the Iron Horse Park Superfund Site, identifying a preferred alternative for addressing site contamination. Subsequently, on May 16, 1991, EPA issued a Supplement to the Proposed Plan for the Shaffer Landfill, identifying a modified preferred alternative. For a detailed description of the modified preferred alternative, and other remedial alternatives evaluated, refer to the May 1991 Proposed Plan document, and the Feasibility Study for the Shaffer Landfill. An outline of the major components of the modified preferred alternative, and a list of the other remedial alternatives evaluated for the site in the Feasibility Study, are provided below.

Components of the modified preferred alternative upon which public comment was taken include:

- Reconstruction of the entire Landfill cap.

This will improve its overall stability and its ability to prevent precipitation from leaching through the landfill. Reconstruction would be achieved by removing the existing topsoil layer, adding additional low-permeability soil to; 1) provide a 5% grade on the top of the Landfill lobes, and 2) provide a consistent smooth sub-grade on the Landfill side slopes, installing an impermeable textured membrane liner over the entire Landfill area, installing a 6-inch drainage layer, installing a non-woven filter fabric between the drainage and topsoil layers, reinstalling the topsoil layer to a depth of 12-inches, and reseeding the disturbed areas;

- Construction on necessary surface water drainage system;
- Maintenance of cap, surface drainage system, and landfill gas collection/flare system. If necessary, improvements will be made;
- Monitoring of the gas collection/flare system;
- Construction, operation and maintenance of leachate collection facilities;
- Off-site treatment and disposal of leachate;
- Construction of a site perimeter fence;
- Monitoring of groundwater and surface water quality.

The seven additional cleanup alternatives evaluated in the Feasibility Study were:

- No Action Alternative
- Landfill Cap Completion/Repair
- Landfill Cap Completion/Repair with Leachate Collection
- Landfill Cap Completion/Repair with Leachate Collection and Groundwater Extraction and Treatment
- Partial Reconstruction of Landfill Cap with Leachate Collection and Treatment
- Partial Reconstruction of Landfill Cap with Leachate Collection and Groundwater Extraction and Treatment
- Total Reconstruction of the Landfill Cap
- Total Reconstruction of the Landfill Cap with Groundwater Extraction and Treatment

II. Site History and Background on Community Involvement and Concerns:

The Iron Horse Park site was proposed to the EPA Superfund National Priorities List (NPL) in September 1983. The Site is located in Billerica, Massachusetts, near the Tewksbury town line. It includes both active and inactive industries, waste storage areas and landfills within the Iron Horse Industrial Park complex as well as the Shaffer Landfill, which is adjacent to the Industrial Park.

Several operable units have been identified within the Iron Horse Park Superfund site in addition to the Shaffer Landfill. These operable units are in different stages in the Superfund cleanup process. As part of this cleanup process, the Johns-Manville Asbestos Landfill has been capped and covered and the B&M waste lagoons have had bioremediation selected as a cleanup remedy and the bioremediation process itself is currently being designed. Other contaminated areas of the Iron Horse Park site will be investigated in a later Remedial Investigation. This responsiveness summary is part of the Record of Decision identifying a cleanup for the Shaffer Landfill section of the Iron Horse Park Site.

When the Iron Horse Park site was first proposed as a Superfund site in 1983, several citizen groups that had originally been organized around individual issues merged into the Superfund Action Coalition (SAC). This group has been active in monitoring local, federal and state activities at the site, commenting on cleanup activities, and building coalitions with other groups interested in Superfund.

Media coverage of the Iron Horse Park site has been fairly extensive since the first citizen concerns with the Site were raised in the early 1970s. The addition of the Iron Horse Park Site to the NPL in September 1984 was reported widely by local radio, television and newspapers, including the Lowell Sun, Billerica Minuteman, and Billerica News. Citizens have shown varying levels of concern over the years with the different parts of the Iron Horse Park Site, but concern over the Shaffer Landfill has been relatively consistent and focused. Local residents' interest in the Landfill initially surfaced in 1971 when inspections by the Board of Health revealed that the Landfill was not in compliance with numerous environmental regulations. "Citizens to Enforce Dump Controls" (CEDC) was formed shortly after this discovery to bring pressure on local officials to ensure that the Landfill met all applicable regulations. CEDC has since become part of the SAC, which has remained a strong proponent of Landfill closure and capping due to perceived health and environmental impacts from the Landfill. SAC has met with state, local and federal officials to monitor the progress of the various

activities at Iron Horse Park. The site Remedial Project Manager is in regular contact with the SAC to keep it informed of ongoing site activities.

At public meetings discussing the Remedial Investigation (August 1989) and the Proposed Plan (February 1991) for the Shaffer Landfill section of the Iron Horse Park site, residents have consistently expressed concerns about potential ground and surface water contamination caused by leachate from the Landfill. Odors, destruction of wetlands and site security have also been mentioned as concerns. Local response to EPA's proposed plan is documented in the next section of this Responsiveness Summary.

III. Summary of Comments Received during the Public Comment Period and EPA Responses to these Comments

This Responsiveness Summary summarizes the comments EPA received during the public comment periods held from January 16, 1991 to March 16, 1991, and from May 17, 1991 to June 17, 1991. 133 sets of written comments were received from Town of Billerica officials, representatives of state and federal governments, state agencies, area residents, members of the Superfund Action Committee, representatives and consultants for Graypond Realty - the owner of the Shaffer Landfill, and other interested parties. In addition, oral comments were received at hearings held on February 5, 1991 and February 19, 1991. All of these comments are summarized below.

A. Summary of resident and other interested party comments

Comments from residents and other interested parties are summarized below, along with EPA responses. Where the same or similar comments have been given by more than one person they have been grouped together for the purposes of providing a complete response. The comments are organized in the following categories: 1) EPA's Preferred Alternative; 2) Groundwater and Surface Water issues; 3) Miscellaneous Comments.

1. EPA's Preferred Alternative

Comment a: Several residents and town officials expressed concern that the long-term maintenance and monitoring of the Landfill required some form of monetary guarantee. Methods recommended by commentors include: citizen monitoring of agreements, contracts with penalties, performance bonds,

trust funds, escrow accounts or other forms of financial commitments.

EPA's Response: If responsible parties undertake implementation of the remedy at the Shaffer Landfill, that implementation would take place under a Consent Decree. A part of that agreement would address financial assurance mechanisms covering all work at the Landfill, including Operation and Maintenance.

Comment b: Several residents said that the existing landfill venting/flare system should not merely be maintained, but should be redesigned and rebuilt. According to these residents the current system does not work properly. One resident said that he had smelled odors from the Landfill on the way to the February 19, 1991 hearing.

EPA's Response: At this time, it does not appear that the existing Landfill venting/flare system needs to be redesigned and rebuilt. Proper operation and maintenance of the existing system will improve its performance. However, EPA will be reviewing the effectiveness of this portion of the remedy to ensure that it is operating properly. If necessary, improvements will be made. Additionally, other sources of release of landfill gas and odor exist that contribute to the problem. These additional sources are leachate outbreaks and gases that permeate through the existing cap surface. The proposed installation of leachate collection facilities and a less permeable, improved cap should help to reduce the problems being encountered.

Comment c: Most of the residents who offered comments at the public hearings, including residents, the local state representative and representatives of the Billerica town government, stated that EPA should require the reconstruction of the entire cap of the Landfill, not just the top portion. Several people who made this point noted that the sides of the cap, not the top, are the places that have experienced the most severe erosion problems, and are the places where leachate breakouts are occurring. One resident noted that EPA's Remedial Investigation for the site showed that the existing cap does not even meet the full requirements of the 1984 consent agreement between the Landfill owners and the state, both on the top and the sides of the Landfill. Other reasons for rebuilding the cap include that the Landfill does not comply with state "flat" requirements and that the side slopes of the landfill are at a 2 to 1 slope when they should be at a 3 to 1 slope.

EPA's Response: Concerns that the side slopes were not being reconstructed and that the entire Landfill was not being capped have been addressed by EPA in the Selected Remedy

wherein the entire Landfill cap will be rebuilt. Slopes in excess of 3 to 1 will remain, however specific measures to enhance the stability of these slopes are included in the Selected Remedy.

Comment d: Several residents and town officials agreed with EPA's plans to collect leachate and treat it off-site. Most of these commentors, expressed concern about trucking leachate through local neighborhoods, however, and said that leachate should be moved by railroad tank car rather than truck.

EPA's Response: Methods for transporting leachate off-site will be examined during remedial design. Depending on the destination of the leachate, rail may or may not be a viable means for leachate transportation.

Comment e: Several residents and the Massachusetts Department of Public Health, said they agreed with EPA's decision to build a site perimeter fence. One resident remarked that it has been 25 years since residents first requested a fence around the site, and she said that she is glad that a site-perimeter fence is finally part of the Landfill clean-up plan.

EPA's Response: EPA feels that restricted site access is necessary in order to protect public health and also to protect the integrity of the Landfill cap.

Comment f: A resident said that EPA's reports should explicitly address all of the leachate breakouts, and leave none of them uncorrected.

EPA's Response: One of the purposes of total reconstruction of the Landfill cap is to address leachate outbreaks.

Comment g: A resident said that 1966/67 state permits for the Landfill, required a liner, which was never installed, but the permit was not revoked. He said that this points to the need for a completely reconstructed cap and greatly improved monitoring of the site.

EPA's Response: The Selected Remedy includes reconstruction of the entire cap. A monitoring program for the Landfill that addresses groundwater, surface water, and air monitoring will be prepared during design of the remedial action.

Comment h: Several residents said that EPA should develop and fund in advance plans to deal with the possibility of leachate spills, either at the site or on any planned transportation routes, or other possible site disasters.

EPA's Response: All applicable requirements relating to the storage, transportation, and treatment of leachate will be met. These requirements may be applicable depending on the results of leachate testing. RCRA Subtitle C requirements for Contingency Plans and Emergency Procedures are relevant and appropriate based on current site specific information.

Comment i: A resident stated that EPA should schedule routine retests of all media to monitor migration of chemicals off-site after implementation of a cleanup alternative. He added that threshold values for pollutants should be set, and that the public should be notified if these values have been met or exceeded and that EPA should have plans in place that will allow it to respond quickly if a problem is revealed by this monitoring.

EPA's Response: As discussed above, a monitoring program will be designed and implemented. Part of EPA's community relations program for the Iron Horse Park Site includes notifying affected residents, officials and news media of any new data regarding actual or potential, current or future site risks. EPA will also send all sampling results to the Billerica Public Library, which is the local information repository for the Site. One of the goals of the selected remedy is to achieve all ARARs for groundwater quality through natural attenuation after implementation of the remedy (reconstruction of the cap, collection and treatment of leachate off-site). If, upon review of monitoring data, it is determined that the remedy is not protective, EPA may determine that additional remedial action is warranted.

Comment j: A resident said that EPA's preferred alternative (Alternative 4) in the January Proposed Plan depended too heavily on maintenance and monitoring, areas that have been a historical weak point at the Shaffer Landfill. She suggested that the best solution for the Landfill is the one that requires the least amount of monitoring, precisely because this is what can be expected from the Landfill owners. She added that total cap reconstruction is her preferred alternative.

EPA's Response: EPA's Selected Remedy includes reconstruction of the entire Landfill cap. Maintenance is a necessary component of any remedy. Additionally, any remedy chosen would depend on monitoring in order to quantitatively evaluate the effectiveness of the remedy as well as the condition of the affected media.

Comment k: A resident expressed concern that the EPA's preferred alternative from the January Proposed Plan would not adequately protect the Town of Tewksbury's wells.

EPA's Response: The Town of Tewksbury's wells have been shown not to be in the migration pathway from the Shaffer Landfill, either with or without implementation of the Selected Remedy. This issue is discussed on pages 2-13 and 2-14 of the January 1991 Feasibility Study. In summary, the Landfill is not considered a threat to the Tewksbury wellfield because the natural direction of groundwater flow from the Landfill is directed away from the wellfield by natural geologic barriers. However, EPA will be monitoring groundwater quality and will take additional response action if it is determined that the remedy is no longer protective.

Comment l: A representative from the Board of Health of the Town of Billerica presented the Board's preferred cleanup alternative for the site. The alternative "must include, but may not be limited to the following issues. EPA must require 1) a total cap reconstruction, 2) repair and, if necessary replace or expand the current methane collection system; 3) containment, collection and treatment of groundwater; 4) leachate collection and treatment; 5) proper operation and maintenance in place and properly funded; 6) a significant contingency fund to cover the cost of any surprises; 7) cleanup of Richardson Pond; 8) we need a significant escrow account for future repairs or work that may need to be performed." (Note: These 8 points are essentially the same as the 8 issues identified in form letters sent to EPA by Billerica Residents during the comment period. EPA received 113 copies of this letter, with a total of 236 signatures.)

EPA's Response: The Selected Remedy includes total cap reconstruction, repair/operation and maintenance of the landfill gas system, leachate collection and treatment, and overall operation and maintenance activities. The items not included in the Selected Remedy are 1) groundwater containment, collection, and treatment and 2) cleanup of Richardson Pond. Regarding item number 3), the need for an escrow account, please see the response to comment 1.a., above. The groundwater contamination will be addressed by natural attenuation processes and by implementation of the Landfill cap reconstruction and the leachate collection system which will reduce on-going releases. There are no known off-site receptors currently being exposed to potentially contaminated groundwater. Although Site surface waters are targeted to be studied in the 3rd operable unit at Iron Horse Park, Richardson Pond should benefit significantly by virtue of the total Landfill cap reconstruction and the leachate collection system.

Comment m: Several residents commented that EPA's preferred alternative in the January Proposed Plan was based primarily on cost effectiveness, and they believed EPA should be seeking the most effective solution that provides the

greatest degree of protection for human health and the environment, not "the wallets of the polluters."

EPA's Response: EPA's Selected Remedy must be based upon finding that the remedy is protective of human health and the environment, attains ARARs and is cost effective. All of these factors were fully and carefully evaluated in making a determination that the Selected Remedy is consistent with the intent of CERCLA. A determination of cost effectiveness requires EPA to ensure that costs are proportionate to the overall effectiveness of the remedy. The Selected Remedy is the most cost effective of all remedies considered and provides a high degree of overall protection of human health and the environment.

Comment n: One resident said that the chosen cleanup solution should include continuous community involvement in the monitoring process. Another noted that all information about test results and ongoing monitoring should be made public so that the community can monitor progress at the site. This resident said the information should be available to the Billerica Board of Selectmen, the Board of health, and the Billerica Public Library. One resident suggested that EPA should send ongoing progress reports to the same list of recipients.

EPA's Response: EPA encourages community involvement throughout the cleanup at the Shaffer Landfill/Iron Horse Park Superfund Site and is committed to a proactive community relations program that will ensure public information is released as it becomes available. With regard to local availability or access to Site information, EPA has established the Billerica Public Library as a local information repository containing all information regarding the Iron Horse Park Superfund Site, and as discussed earlier sampling results will be made available at the Library. EPA also issues site updates periodically or at milestones in the remedial process. EPA also encourages residents to utilize the agency's designated information contacts that appear in all fact sheets and press releases whenever they have questions and comments regarding site activities.

Comment o: During the informal public hearing, Billerica's State Representative Brian M. Cangiamila said that EPA's preferred cleanup option for the Site should address existing arsenic contamination in the groundwater by extracting and treating groundwater. He recommended that EPA consider it's alternatives 5 or 5A for cleanup of the Site. In his written comments he applauded EPA, the Town of Billerica and the Superfund Action Committee's work. Rep. Cangiamila's written comments mirrored those of the Town of Billerica and many others in urging for total cap reconstruction, an on-site

leachate and groundwater treatment facility, improvements to the gas venting and flare system, and financial guarantees such as bonds or escrow accounts to assure future site monitoring and cleanup needs can be met.

EPA's Response: Arsenic contamination in groundwater in the vicinity of Iron Horse Park is not limited to the Shaffer Landfill area. Some degree of arsenic may be a natural occurrence in the area, although the Shaffer Landfill may contribute to increases in arsenic downgradient (arsenic has been detected downgradient of the Landfill at higher levels than have been detected upgradient). Improvements to the cap to reduce percolation of precipitation through the refuse would be more effective than groundwater extraction and treatment for addressing what may to be a natural presence of arsenic. As discussed earlier, EPA believes that no one is currently consuming this affected groundwater.

Comment p: A resident said that EPA should develop concentric rings of monitoring wells that could precisely locate the speed and direction of any leachate migration. Another resident said that there should be a series of wells adjacent to the Landfill, and another adjacent to property lines.

EPA's Response: EPA's Selected Remedy includes groundwater monitoring. The monitoring system will include a series of wells positioned to provide data on migration of groundwater and potential contamination. The final number, configuration, and depth of monitoring wells to be included in the monitoring network will be addressed during design of the remedial action.

Comment q: A Billerica Town selectman commented that EPA should require before and after stack monitoring of the gas collection/flare system to make sure that no hazardous chemicals are being burned at improper temperatures.

EPA's Response: Monitoring of the gas flare is a part of EPA's Selected Remedy, as well as long-term operation and maintenance of the gas system. EPA agrees that monitoring should be done both before and after combustion to assess the effectiveness of the process as well as monitor for incomplete combustion residuals.

Comment r: A Billerica selectman said that any groundwater treatment should be done off-site because on-site treatment would be too costly and an on-site treatment plant could be damaged by vandalism.

EPA's Response: No groundwater treatment, either on-site or off-site, is proposed. If reference is to leachate treatment, the Selected Remedy requires off-site treatment.

Comment s: A resident said that EPA has assumed that the portions of the cap that won't be reconstructed have been properly installed, an assumption that he believes is not well founded given the Landfill owners past failure to comply with regulatory requirements. He added that there is no information in EPA documents that would back up this assumption. He also said that EPA should be concerned about whether the existing cap can adequately protect against frost damage in the absence of a drainage layer.

EPA's Response: On pages 5-10 and 5-11 of the Feasibility Study, it was explicitly noted that deficiencies in the cap existed, but that the investigations needed to delineate deficient areas would be more detrimental than helpful. In EPA's Selected Remedy the entire Landfill cap is to be reconstructed and will include a drainage layer.

Comment t: A resident suggested that EPA should include some institutional controls to prevent future residents from drinking groundwater near the Landfill and to protect them from exposure to contaminated soils. The Massachusetts Department of Public Health, in its written comments, also suggested institutional controls as a way to restrict future groundwater and surface water use to protect the public against exposure.

EPA's Response: Institutional controls will be placed on the property to prevent future use of groundwater beneath the Landfill as well as throughout the contaminated plume as drinking water and to prevent activities from being conducted on the Landfill surface that would compromise the integrity of the cap or otherwise compromise the protection of human health and the environment.

Comment u: A Billerica selectman suggested that EPA should have given a cost estimate for retrofitting the Landfill with a complete liner. He said that such an estimate would show the true cost of proper disposal at the Landfill and would therefore show that the selected solution is reasonable from a cost perspective.

EPA's Response: The cost for retrofitting the Landfill with a liner would be so large that it would have little meaning. There would be no validity to the cost estimate because the activities required to implement such a remedy would effectively be impossible.

Comment v: One resident sent a written comment to EPA which stated that site neighbors deserve the most thorough and complete cleanup that is technologically feasible.

EPA's Response: EPA feels that the Selected Remedy is the remedy which is most consistent with CERCLA; by being protective of human health and the environment, attaining ARARs, and being cost effective. In addition, the remedy satisfies CERCLA's preference for treatment and utilizes alternative treatment technologies or resource recovery technologies to the extent practicable.

Comment w: In a written comment, Representative Edward J. Markey, U.S. Congressional representative for the Billerica area, agreed with town officials and many other commentors that EPA should recommend total reconstruction of the Landfill cap. In addition, Rep. Markey supports the implementation of a comprehensive monitoring program that includes contingencies for treating groundwater should that be necessary.

EPA's Response: The Selected Remedy includes total reconstruction of the Landfill cap and monitoring of groundwater and surface water. As discussed in the response to comment A.1.i, monitoring data will be evaluated to determine if further remedial action is necessary.

Comment x: The Billerica Board of Selectmen, Board of Health, Conservation Commission and the Superfund Action Committee commented that they supported a total cap reconstruction for the Landfill, implementation of institutional controls to prevent exposure to site contaminants and prevent the future use of on-site groundwater, the implementation of a Natural Resource Damage Assessment as provided for by CERCLA § 107, a groundwater extraction and treatment program, a leachate collection and treatment system complete with extra funding for future potential costs, off-site leachate treatment, on-site disaster recovery procedures and equipment, emergency groundwater containment and treatment plans (in case of spills), the public disclosure of all cleanup plans and procedures, independent testing and monitoring of compliance, full up-front funding which includes an emergency contingency plan, transportation of materials, particularly hazardous materials, by rail, and the cleanup of Richardson Pond. Patricia McGovern, State Senator for the Town of Billerica, supported most of these recommendations in a separate letter to EPA.

EPA's Response: Several of the remedial elements proposed, such as total cap reconstruction, leachate collection and off-site treatment, and monitoring, are included in EPA's Selected Remedy. As noted in the response to comment A.1.l, groundwater extraction and treatment is not included, and the reasons are cited therein. Emergency procedures are discussed in response to comment A.1.h. Institutional controls are discussed in the response to A.1.t.

Transportation of materials for the remedial action by rail will be considered along with other options during the final design. As discussed in the response to A.1.1, Richardson Pond and the rest of the surface water at the Site will be addressed as a part of the 3rd operable unit. The Natural Resource Trustees, which include the Department of the Interior, the Department of Commerce and the Commonwealth of Massachusetts, are the entities that make the determination of whether a Natural Resource Damage Assessment is warranted at a given site, and the Trustees have not indicated that a Damage Assessment is warranted as yet.

Comment y: In addition to its jointly submitted comments, the Billerica Conservation Commission made the following points in their comment letter: the source of contaminants to Richardson Pond needs to be resolved, encroachment of Landfill slopes into wetlands should be a last alternative to slope stabilization (they recommend erosion blankets or other aggressive stabilization measures), on-site leachate collection is necessary, detailed groundwater monitoring should be implemented with contingencies for treatment if groundwater quality exceeds MCLs, and a representative of the Town should participate in review of the remedial design submittal.

EPA's Response: No further encroachment into wetlands by Landfill slopes, on-site leachate collection, and groundwater monitoring are all included in EPA's Selected Remedy. Regarding resolution of the source of contaminants to Richardson Pond, the reconstructed cap in combination with the leachate collection system will address the Landfill as a source of contamination. However, the actions will not resolve other potential groundwater contaminant sources within the industrial park nor possible upgradient surface water sources. As discussed in response to A.1.1, the study of Site surface waters will be a part of the 3rd operable unit. As discussed in the response to comment A.1.n, mechanisms are in place which ensure that information regarding the Shaffer Landfill/Iron Horse Park Superfund Site continues to be made available to the public in a timely manner. In addition, EPA encourages representatives from the town, local residents and other concerned parties to review final remedial design documentation and provide our agency with any comments or concerns they may have.

Comment z: The Billerica Board of Health, in addition to its jointly submitted comments above, identified the following items that it feels need to be addressed in EPA's selected cleanup plan: a groundwater extraction and treatment system should be installed to protect the Tewksbury wellfield, total cap reconstruction should take place, the methane collection system should be upgraded, Richardson Pond should become a

main focus of the Landfill cleanup, and EPA should require an extensive, sufficiently funded operation and maintenance program for at least the next thirty (30) years.

EPA's Response: As discussed in response to A.1.k, it has been shown that Tewksbury's public water supply wellfields are unlikely to become contaminated due to discharges from the Landfill Total cap reconstruction and operation and maintenance activities are to be included in the EPA's selected remedy. Groundwater extraction and treatment is not currently considered necessary as discussed in the response to A.1.l. Improvements to the landfill gas control system are discussed in response to comment A.1.b. Cleanup of Richardson Pond is discussed in the response to comment A.1.l. As discussed in response to comment A.1.a, financial assurance mechanisms covering all site work would be a part of any agreement with responsible parties. Operation and maintenance are included as part of the Selected Remedy.

Comment aa: In addition to the jointly submitted comments noted above, the Billerica Board of Selectmen submitted copies of correspondence between the Massachusetts Health Research Institute, Inc. and the Agency for Toxic Substances and Disease Registry (ATSDR) dated April and June, 1990. This correspondence discussed a pre-application for funding from ATSDR to conduct a health study regarding "Environmental Exposure to Asbestos and its Impact on Health in the Communities of Billerica and Walpole, Massachusetts". The Board also requested that it be given the opportunity to comment on future phases of the cleanup throughout the 30 year remediation period.

EPA's Response: The correspondence submitted regarding plans for on-site health studies are independent of any Superfund activities at the Shaffer Landfill. Although EPA is required to conduct only one formal public comment period during the Superfund process, EPA's Region I office encourages the public to submit comments and questions at any time throughout the duration of cleanup activities. EPA welcomes any comments or input the Billerica Board of Selectmen and the public would like to provide.

Comment bb: The Billerica Town Finance committee submitted written comments which stated that the Superfund Action Committee's proposed remedial actions would best protect residents and future generations and would save taxpayers money in the long run.

EPA's Response: See response to comment A.1.x.

Comment cc: The Massachusetts Bay Transportation Authority (MBTA) stated in a written comment that it was opposed to any

alternative cleanup plan that interfered with its existing railroad right of ways.

EPA's Response: EPA's Selected Remedy will not interfere with existing railroad right of ways.

Comment dd: One written comment said that EPA's selected alternative for cleaning up the Shaffer Landfill ignored the impacts of the dump on the surrounding environment, specifically the impacts on fish and wildlife in Richardson Pond, groundwater beneath the Landfill which won't be helped by a leachate collection system built above the water table, and downstream receptors of Content Brook - Pomps Pond in Andover, Camp Marymeeting (Girl Scout camp in Andover) and Dragoonian Farms.

EPA's Response: The Selected Remedy provides controls to reduce the potential release of additional contaminants into the environment with the reconstruction of the Landfill cap and the installation of the leachate collection system. With these mechanisms in place to minimize further introduction of contaminants into the groundwater, natural attenuation processes will be better able to mitigate any existing groundwater contamination past the point of compliance (the edge of the waste management unit). Because the groundwater and surface water are dynamic systems, natural flushing and degradation of contaminants will occur once the on-going source of contamination has been controlled. Cleanup of Richardson Pond as well as other surface waters is discussed in response to A.1.1.

Comment ee: The Massachusetts Dept. of Public Health said, in its written comments, that EPA's conclusion that contamination of the Tewksbury wells by the Landfill is 'unlikely' is supported by MADEP monitoring results at the wells which show no significant VOC concentrations.

EPA's Response: This statement is a revision of a previous conclusion contained in the 1988 and 1990 (amended) document entitled "Assessment of Public Health for Iron Horse Park". This revised conclusion supports the conclusion documented in the Feasibility Study regarding risk of contamination to the Tewksbury wells.

2. Groundwater and Surface Water

Comment a: Several residents and Billerica Town officials commented that the Landfill was originally built by excavating below the pre-existing surface topography, and that materials may have been placed below the water table level in the Landfill. One

resident claimed that the excavation was as much as 15 to 20 feet below the pre-existing level of the wetlands. If landfilled material was placed below the water table, this means that a leachate collection system will not effectively prevent all contaminants from reaching the groundwater.

EPA's Response: Refuse previously placed below the groundwater table was immersed in water upon placement. Soluble contaminants would have begun leaching immediately and, if the material has been in place for several years, there would not be much likelihood for a substantial source to remain. The much greater mass of refuse above the water table in the Landfill may still contain significant volumes of contaminants with the potential to migrate to the groundwater as a result of infiltration of precipitation. The proposed reconstructed landfill cap is intended to significantly reduce infiltration of precipitation and thereby isolate those contaminants within the Landfill mass.

Comment b: Several residents said that EPA should institute a groundwater extraction and treatment program as part of its solution at the Landfill. Reasons cited as justifying such a program were: the placement of some landfilled materials below the water-table, the possibility of future releases from leaking drums or chemical sources, the existence of background levels of arsenic, and the current and potential future use of groundwater wells by Landfill abutters.

EPA's Response: At this time, there does not appear to be justification for groundwater extraction and treatment. Placement of landfilled materials below the water table is discussed in the response to the previous comment. There is very little evidence that suggests that drums were placed in the Landfill. The possibility of future releases from leaking drums is addressed by providing adequate containment with an improved cap, thereby minimizing the infiltration of precipitation which is needed to transport the leaking material through the surrounding refuse to the groundwater. Background levels of arsenic are by definition (i.e. "background") the result of natural conditions, cannot be controlled through extraction and treatment of groundwater and cannot be addressed under Superfund. Potential use of groundwater can be prevented through institutional controls.

Comment c: Several residents noted that leachate breakouts on the Richardson Pond side of the Landfill are contaminating the Pond because leachate is migrating

through existing culverts underneath the railroad. According to one resident, the FS does not address this hydrologic connection between the Landfill and the Pond. EPA should block these culverts, build some containment structure, such as vertical barriers, or do something else to prevent landfill leachate contamination from reaching the pond through this drainage pathway.

EPA's Response: The final design should include permanent interruption of any old railroad culverts buried under refuse that may be acting as conduits for leachate to Richardson Pond. In regard to overland migration of leachate to culverts that are still functional, that migration should be mitigated by the proposed reconstructed cap and addition of the leachate collection system.

Comment d: A resident said that, in light of EPA claims that fractured bedrock underlies part of the site, EPA should make an attempt to stop contaminants from migrating to the Tewksbury wellfield.

EPA's Response: The fractured bedrock is significant in regard to the discussion of possible vertical barriers to groundwater movement. Because the upper portion of the bedrock is fractured, a permanent seal cannot be provided at the base of a vertical barrier, thus making such a barrier ineffective. However, this fracturing of the upper portion of the bedrock does not compromise the effectiveness of the natural geologic barrier to groundwater movement in the direction of the Tewksbury wellfield.

Comment e: One resident said that groundwater should be contained on site.

EPA's Response: Containment of groundwater is not attainable due to the fractured nature of the bedrock in the vicinity of the Landfill. (See previous response)

Comment f: A resident asked that EPA show risks from groundwater at the Landfill in more realistic terms than the risk to someone who drinks two quarts of groundwater every day for seventy years.

EPA's Response: By calculating risk to a person consuming two quarts of water per day for seventy years, EPA has tried to establish a reasonable worst case scenario for this exposure route. Most people would have less exposure, thereby decreasing their risk. This method is standard EPA practice, and is consistent with EPA guidance.

Comment g: A resident said that there are surface waters near the Landfill that have not been tested. Specifically she cited a large pond between 90 and 100 Gray St. and a "good-sized" pond next to 113 Gray St..

EPA's Response: These surface waters are located beyond the boundary of the Site. Because groundwater data does not indicate a likelihood of off-site surface water contamination resulting from a groundwater/surface water interconnection these waters were not investigated.

Comment h: A resident said that a consultant hired by the community found radioactive tritium in pools "near the rear of the test site" in 1989 at levels that were seven times the ambient level for the area. This shows, according to the resident, that something had been dumped in the Landfill that clearly shouldn't have been, and she asked if EPA knew of any such dumping.

EPA's Response: EPA is not aware of a dumping event involving tritium.

Comment i: A resident expressed concern about soil and water testing. He noted that he lived about 1 mile down Content Brook from the Site, and that he had experienced color variations and odor problems from the Brook. He asked if testing of the Brook has been done that far from the Site, and he said that soil testing should be done within a one mile radius of the Site.

EPA's Response: Other than wind and water erosion, there are no other mechanisms to naturally move contaminated soil from the point of release to off-site locations. In regard to the Shaffer Landfill and its associated contamination, there is no reason to expect off-site soil contamination based on wind and water erosion, and there would be no justification for soil testing "within a one mile radius of the site". As such, this testing has not been performed. Regarding color variations and odor problems in the Brook one mile from the Landfill, there may be some connection with the Landfill. However, given the distance from the Landfill, there would be the potential for other sources or causes. Also, for surface water problems to be observed at a distance of one mile from the site, more severe problems would be expected in the vicinity of the Landfill than have been found to date. In addition, as discussed in response A.1.1, Site surface waters are to be studied as a part of the 3rd operable unit.

Comment j: The Massachusetts Department of Public Health noted that elevated benzene levels were detected in

groundwater southwest of the Landfill. The Department suggested that groundwater flow in this area should be determined in order to assess the possibility of environmental exposure to this compound.

EPA's Response: Groundwater flow in this area (well OW-8) is to the northeast, and is clearly upgradient of the Shaffer Landfill.

3. Miscellaneous Comments

Comment a: A businessman said that he is attempting to develop a landfill gas recovery system for the Shaffer landfill that will collect methane from the Landfill, pipe it to another site within Iron Horse Park, and use it to produce energy that would be used for industrial processes and to generate electricity. He said that such a system would be environmentally beneficial, and that it would not interfere with any plans for capping the Landfill or collecting leachate. He also said that he would meet all Mass. DEP and EPA permit requirements.

EPA's Response: The primary goal of the Superfund program is to provide remedies that are protective of human health and the environment. Any potential future use or actions would need to support this goal in order to be considered.

Comment b: Several residents requested EPA to initiate a natural resource damage assessment as provided by Section 107 Paragraph D of CERCLA.

EPA's Response: As discussed in the response to comment A.1.x, the Natural Resource Trustees make the determination of whether a natural resource damage assessment is warranted. In addition, during the remedy selection process, EPA has coordinated with the Natural Resource Trustees in order to seek their input on the Landfill remediation.

Comment c: A town selectman from Billerica said that the lack of documentation for what was actually dumped in the Landfill, the absence of a liner and the fact that the Landfill was built some 15 feet below the existing grade all create special problems for the site. He added that the current lack of site security makes it possible for additional unauthorized materials to be brought to the site.

EPA's Response: The absence of documentation for what was dumped at the Landfill has made it difficult to

document the specific items and materials which were disposed of there. There is, however, significant data on area contamination which is a result of the material disposed of in the Landfill. As a result, EPA has been able to select a remedy for the Shaffer Landfill which is protective of human health and the environment. The issue of site security is addressed in the Selected Remedy by the perimeter security fence.

Comment d: One resident commented that local wildlife and neighborhood pets have been effected by contamination in Content Brook, and said that EPA should make an attempt to clean up the area that goes beyond just covering the Landfill.

EPA's Response: As discussed in response to A.1.l., the study of Site surface water will be a part of the 3rd operable unit.

Comment e: A resident commented that EPA must allow construction plans for the Landfill to be reviewed by the town and its engineers, and that there should be citizen monitoring of the cap, maintenance agreements and leachate collection systems and that periodic reports should be made back to the government by citizen monitors.

EPA's Response: As previously stated in the response to comment A.1.y, EPA encourages citizen review of final design plans which will be placed in the information repository. Any information local community members can provide EPA is welcomed by the agency. EPA invites any periodic reports that local citizens wish to submit.

Comment f: Several residents said that there is a need for a new round of groundwater, surface water and air testing. They said that the 1988 and 1987 data, the most recent data cited in the FS, are not adequate for establishing background contaminant levels prior to cleanup, particularly since groundwater at the site is estimated by EPA to be moving at 50 to 100 feet per year. One speaker noted that two-year old data was not adequate for the purpose of designing a cleanup solution. Residents are also concerned that containers of hazardous substances buried in the Landfill may begin leaking over time, causing groundwater contamination to increase.

EPA's Response: Additional sampling will be a component of the final design and ongoing sampling will be part of the long-term monitoring program. The most significant mechanism for allowing migration of contaminants to the

groundwater, is the infiltration of water. The Selected Remedy, through the implementation of a more impermeable cap, will largely remove this mechanism.

Comment g: A resident said that in one of EPA's surface water testing reports, methylene chloride was detected at levels of 1300 parts per billion, and acetone was detected at around 800 parts per billion, and that these levels were considered to be lab or field contamination, and were therefore downplayed or ignored. The resident noted that 1983 testing performed for the community by Cambridge Analytic found levels of 1100 parts per million of methylene chloride and 850 parts per million of toluene and that this result was confirmed by repeating the test. The resident suggested that EPA should review the initial data to make sure that EPA's FS recommendations are based on correct information.

EPA's Response: Review of the test report results from Cambridge Analytic showed that the results were in parts per billion, not parts per million, indicating much lower levels than stated in the comment. As noted in the response to comment A.3,g, additional groundwater sampling will be performed during final design. However, results such as those reported would not change the proposed remedial action.

Comment h: One resident said that he had consumed water from a groundwater well adjacent to the site for 5 years and has now developed kidney failure. While acknowledging that he didn't know if this was caused by drinking groundwater from the well, he said that he wants EPA to make sure that nobody else is exposed to this potential hazard, even if it costs $50 million dollars to do it.

EPA's Response: As stated in Section VI of this Record of Decision, as well as in other documents, EPA believes that currently groundwater in the area around the Landfill is not being used for drinking water due to the presence of a municipal water supply. Institutional controls will prevent the development of new drinking water wells. The implementation of the Selected Remedy which includes a more impermeable cap and the collection of leachate, will combine to reduce groundwater contamination naturally.

Comment i: A written comment stated that the commentor is exploring plans to use space at the Landfill as a composting facility that accepts leaves, garden and yard waste from surrounding communities. The plan described in the letter envisions covering the Landfill cap with

considerable amounts of compost. The letter also noted that the Landfill, with proper beautification, soil cover and vegetation, could serve as a publicly accessible refuge for wildlife.

EPA's Response: Any future use of the Landfill would have to be reviewed to ensure that it is protective of human health and the environment and is not inconsistent with institutional controls placed upon the property.

Comment j: The MA Department of Public Health (MADPH) said that elevated incidence of lung cancer was detected in the census tract immediately north of the Landfill, and that lung cancer rates for males who live within a one mile radius of the site between 1969 and 1985 were elevated relative to males in the remainder of the town during this period. MADPH suggested that, prior to 1984, residents could have been exposed to hazardous asbestos levels from the inadequately covered asbestos landfill in Iron Horse Park. It also stated that there is no identified ongoing exposure to lung carcinogens at the site. To identify the actual cause of elevated cancer rates, occupational and smoking histories of current and former residents should be considered, radon levels should be measured, and an effort to measure the degree of past asbestos exposure should be made.

EPA's Response: EPA has not identified any hazard from asbestos at the Shaffer Landfill. Additional testing of Landfill gases with regard to composition and the potential for on- and off-site exposure is a part of the Selected Remedy.

Comment k: MADPH suggested that on-site and off-site ambient air monitoring is necessary to assess whether gasses leaking through the Landfill cap pose a health risk. Also, because landfill gasses may migrate laterally, it may be prudent to monitor subsurface methane levels off-site.

EPA's Response: Air monitoring is a part of the selected remedy. Because the Landfill is surrounded by natural surface water barriers (Richardson Pond, Content Brook, and the Middlesex Canal), EPA does not see the necessity for off-site subsurface monitoring of methane levels.

Comment l: MADPH said that barrels with unidentified contents were observed on the Landfill during a recent site visit, and it suggested that the content of these barrels should be characterized and properly disposed.

EPA's Response: The determination was made by an EPA On-

Scene-Coordinator (OSC) that these barrels (in a fenced-in storage area near the property entrance), were stored for use by heavy equipment on site (lubricants or fuel), or were empty, and present no imminent hazard.

B.) Summary of Comments from Potentially Responsible Parties (PRPs)

Three sets of comments from PRPs or their representatives were received, including:

- Rick Shaffer (Suffolk Services)
- Balsam Environmental Consultants (for Graypond Realty Corp.)
- Wright & Moehrke, Counselors at Law (for Graypond Realty Corp.)

The main points made by the PRPs are summarized below. The PRP comments are organized by commentor.

1. Comments from Balsam Environmental Consultants, engineering consultants for Graypond Realty Corporation.

Comment a: Characterization of the groundwater flow system does not adequately support the selected alternative. Downgradient monitoring wells may also be downgradient of the Iron Horse Park site as a whole. Therefore, impacts solely attributable to the Shaffer Landfill are not separated from other possible sources. (Balsam comments, pp. 1-2)

EPA's Response: The substance of this comment contends that there is no documentation for or understanding of regional groundwater flow and therefore a valid interpretation of local groundwater flow could not be developed. The Phase 1C Remedial Investigation deals with the Shaffer Landfill specifically. The Phase 1A RI considered the industrial park as a whole, and addressed such topics as regional groundwater flow. Sufficient information is available in the various studies to arrive at the conclusions stated. In addition, CERCLA remedies must be protective of human health and the environment, and must attain all ARARs. The possibility that some contaminants that contribute to risk or violation of ARARs may be attributable to sources other than the Landfill, does not alter the remediation requirements of CERCLA (i.e. MCLs in groundwater must still be met).

Comment b: Characterization of sources of contamination (within Shaffer Landfill) does not adequately support the selected alternative. A comprehensive evaluation of closure activities undertaken at the Landfill through 1990 is not presented in the RI/FS. Such an evaluation would affect assessment of impacts on this operable unit. (Balsam comments, pp. 3-4)

EPA's Response: A number of data points, including well MW-1, and well cluster OW-49, 50, 51, were used to provided hydraulically upgradient conditions reflecting contaminant background levels prior to impacts resulting from the Landfill. The RI/FS does discuss closure activities at the Landfill up through 1990. During this time, observations were made of air quality violations from Landfill gas, Landfill gas percolating through the cap, erosion problems, leachate outbreaks, inadequate slope areas, and unvegetated areas, all of which pointed directly to adverse impacts.

Comment c: The RI/FS overestimates risks associated with potential future use of on-site ground water. (Balsam comments, pp. 5-6)

EPA's Response: Risk computations are based on observed contaminant levels, and are performed in conjunction with standard EPA practice. This practice is conservative by design, and is intended to account for a worst case (i.e. drinking 2 liters of contaminated groundwater per day for 70 years).

Comment d: The RI/FS does not demonstrate that an imminent hazard exists or that future risks beyond the site boundary exist. (Balsam comments, p. 7)

EPA's Response: The NCP requires that ARARs including drinking water requirements, must be met beyond the edge of the waste management unit, which in this case is the boundary of the Landfill. The potential risk associated with consumption of groundwater beyond the edge of the waste management unit (at well GZA-3) is 2.2 x 10-02 which is unacceptable.

Comment e: The Selected Remedy should contain flexibility with respect to leachate collection, transportation and treatment. (Balsam comments, pp. 8-10)

EPA's Response: Assumptions were used in the Feasibility Study to provide a basis for assessing the conceptual feasibility of leachate collection and treatment. Final design of leachate collection facilities will consider

several estimates including the cap design and composition and recalculated estimates of leachate generation. As leachate collection continues following implementation, the quality of the leachate will most likely change over time, and alternate disposal options may become available. However, until a data base of leachate volume and quality has been established, a conservative disposal method has been assumed. Leachate will be tested to determine the applicability of disposal options.

Comment f: The Selected Remedy should contain flexibility with respect to the Landfill cover design. (Balsam comments, pp. 11-14)

EPA's Response: The Selected Remedy does contain flexibility with respect to the Landfill cover design in areas of excessive slope. With regard to closure work undertaken on the cap, additional investigation of the closure work was conducted as part of the RI/FS. The response to comment B.1.b., discusses some of the deficiencies which currently exist in spite of closure activities which have taken place to date. The presence of these deficiencies as well as the requirements in CERCLA necessitates the undertaking of additional remedial action.

Comment g: A decision to implement a groundwater remedy based on the assumption of future on-site groundwater use at the Shaffer Landfill operable unit would be inappropriate for this portion of the Superfund site. (Balsam comments, pp. 15-16)

EPA's Response: Groundwater remediation is not currently proposed. However, if on-going groundwater monitoring indicated that the remedy is no longer protective, then groundwater extraction and treatment may be considered.

2. Comments from Wright & Moehrke, lawyers for Graypond Realty Corporation

Comment a: Challenges to the use of Superfund to deal with this Landfill.

EPA's Response: Section 105(a)(8)(A) of CERCLA requires that the National Contingency Plan (NCP) include criteria for determining priorities among releases or threatened releases throughout the United States for purposes of taking response actions. Section 105(a)(8)(B) requires that these criteria be used to prepare a list of national priorities among the known

releases throughout the United States. This list is the National Priorities List (NPL). The Shaffer Landfill is part of the Iron Horse Park Site that was included on the NPL on September 21, 1984, in accordance with the criteria developed pursuant to the NCP. The opportunity to challenge this listing was at the time the Site was placed on the NPL. 42 U.S.C. 9613(a) Therefore, it is consistent with the NCP that EPA be addressing this problem under Superfund.

Comment b: Use of Superfund is inappropriate because of limited risk off-site and other institutional barriers to land and water use. (Wright & Moehrke comments, pp. 4-7)

EPA's Response: CERCLA requires that all remedial actions at Superfund sites meet applicable and relevant and appropriate requirements (ARARs). At the Shaffer Landfill, Maximum Contaminant Levels under the Safe Drinking Water Act are ARARs at the Site and, therefore, for the remedy to meet the requirements of Superfund, these drinking water standards must be met at the boundary of the waste management unit not just off-site. See 40 C.F.R. 300.430(e)(2)(i), 55 FR 8713, 8753, March 8, 1990. This is also consistent with Superfund requirements that the remedy be protective of human health and the environment. The commentor has also identified a number of institutional type mechanisms that could be used in lieu of EPA's selected remedy to ensure that there is no risk to human health and the environment from the Site. Section 121 of CERCLA states Congress' preference for treatment and permanent remedies as opposed to simply prevention of exposure thru legal controls. Although institutional controls are used by EPA in the appropriate circumstances, institutional controls should not substitute for more active response measures that actually reduce, minimize, or eliminate contamination unless such measures are not practicable, as determined by the nine evaluation criteria in 40 C.F.R. 300.430(f)(1)(ii). See 55 FR 8706, March 8, 1990. Here, EPA has determined that there are active remediation measures that can be taken after full evaluation of the nine criteria.

Comment c: EPA's site characterization overstates the landfill threat by failing to distinguish leachate impacts from site-wide groundwater impacts. (Wright & Moehrke, pg. 7)

EPA's Response: The response to comment B.1.b indicates that a number of valid data points were used to distinguish between groundwater impacts due to the

Landfill and those due to other sources.

Comment d: EPA's proposed plan does not reflect recent significant Landfill upgrades. (Wright & Moehrke, pp. 7-8)

EPA's Response: Additional assessment of the previous closure work was conducted as part of the FS because the RI was finalized while closure activities were still in progress. These additional investigations noted several deficiencies in the closure work, particularly in regard to capping materials used and thickness of materials placed.

Comment e: The DEP approved closure plan as an ARAR. (Wright & Moehrke, pp. 8-9)

EPA's Response: Section 121(d) of CERCLA requires State applicable or relevant and appropriate requirements (ARAR) to apply generally to the regulated community. The Massachusetts closure plan is site-specific in that it is applicable only to the Shaffer Landfill. Because of this, EPA cannot consider this plan to be an ARAR.

Comment f: RCRA is not an ARAR. (Wright & Moehrke, pg. 9).

EPA's Response: EPA has determined that RCRA Subtitle C is not an applicable requirement because RCRA listed or characteristic hazardous waste has not been disposed of at the Landfill, nor has any treatment or storage of hazardous waste occurred at the Landfill since the effective date of RCRA Subtitle C. Portions of RCRA Subtitle C are relevant and appropriate based on current site specific information including: Groundwater Monitoring, Tanks, Contingency Plans and Emergency Procedures, Locational Standards and RCRA Post Closure Requirements. Contingency Plans and Emergency Procedures, Groundwater Protection, Manifesting and Record Keeping, Tanks, Closure and Post Closure and Locational Standards may be applicable depending on the results of leachate testing. The leachate will be tested to determine if any of the RCRA requirements, including land ban are applicable. The offsite leachate treatment and disposal must meet all Federal and State requirements. References to these provisions in Appendix D are to the State hazardous waste regulations that have been approved by EPA pursuant to RCRA.

3. Comments from Rick Shaffer

Comment a: Information used as the basis for the Feasibility Study is obsolete.

EPA's Response: The response to comment B.2.d indicates that assessment of previous Landfill closure work was conducted during the preparation of the FS.

Comment b: All potential sources of contamination at the Iron Horse Park site must be investigated before any final remedial plan is approved.

EPA's Response: As discussed in response to comments B.1.a., and B.1.b., work was performed to characterize both regional groundwater trends, and to isolate contamination attributable to Shaffer Landfill from contamination due to other potential sources. The Iron Horse Park Superfund Site was divided into operable units following the Phase 1A RI precisely because it is a large and complex site. This allows remedies to be selected for specific, distinct contamination problems, and ultimately allows the time prior to the start of remedial action to be lessened.

Comment c: The selected remedy should be flexible in terms of allowing for future use of the Landfill.

EPA's Response: The primary goal of the Superfund program is to provide remedies that are protective of human health and the environment. Any potential future use/actions would need to support this goal in order to be considered.

Comment d: Bioremediation should not be excluded as a potential remedy for groundwater or surface waters. The success of wetlands near the site in treating impacted water indicates that biological treatment of water at the site may be viable.

EPA's Response: As discussed in earlier responses, site-wide surface waters will be addressed during the 3rd operable unit. There is no need to consider bioremediation of groundwater at this time as the Selected Remedy calls for attainment of cleanup levels through natural attenuation.

Comment e: Background groundwater, surface water and sediment contaminants are insufficiently characterized.

EPA's Response: As discussed in response to comments B.1.a., and B.1.b., sufficient characterization of background groundwater, surface water, and sediments has been provided to demonstrate adverse impacts in and

around the Landfill which are specifically related to the Landfill.

C. Comments of the Massachusetts Department of Environmental Protection (MA DEP)

The MA DEP submitted comments on EPA's Feasibility Study and Proposed Plan. These comments are grouped by topic and summarized below.

1. Applicable or Relevant and Appropriate Requirements (ARARs)

Comment a: In its comments, DEP identified the ARARs within its jurisdiction which it believes should be applied when evaluating remedial action at the Shaffer Landfill Operable Unit of the Iron Horse Park Superfund Site.

EPA's Response: EPA has met with DEP and agreed upon the State ARARs that are identified in Appendix D of this Record of Decision. EPA disagrees with DEP's identification of the MCP, 310 CMR 19.021, 19.150, and 19.151 as ARARs and has not included them among the ARARs for the Landfill.

Comment b: To meet the ARAR for final landfill cover, DEP recommends that the top portion of the Landfill should be upgraded to include 1) a low permeable layer of compacted material 18" deep with a permeability of 1x 10^{-7} or a flexible membrane liner and 2) a filter material layer. DEP also recommends that the side slopes of the Landfill should be upgraded to achieve a minimum depth of 12" of compacted low permeability material with the maximum permeability as specified in the 1984 DEP-approved Closure Plan. DEP also recommends upgrading the side slopes to achieve a 12" soil layer to support vegetative cover. DEP believes these upgrades would be an acceptable Alternative Landfill Final Cover System Design as described in 310 CMR 19.113, and would address DEP's concerns about current side slope soil and clay-cover erosion.

EPA's Response: The Selected Remedy meets or exceeds the DEP requirements for final landfill cover at the Shaffer Landfill.

2. Implementation

Comment a: DEP believes that the requirement to construct a fence and post signs should be implemented immediately after the signature of the ROD. DEP will pursue the construction and posting of the fence independently to try to expedite this segment of the remedy. DEP also suggests that because the adjoining wetlands and canal pose a deterrent to trespassers, EPA should allow for flexibility in fence design and should monitor the effectiveness of a three-sided site fence.

EPA's Response: During remedial design, EPA will evaluate the appropriateness of phasing construction of the remedy. In addition, EPA will evaluate the appropriateness of a three-sided site fence during the design phase of the remedy.

Comment b: DEP believes that treatment and disposal options for landfill leachate should be evaluated and selected during the predesign phase after the leachate's chemical properties and characteristics are determined. On-site leachate treatment should be evaluated for any reliability, health and safety, or cost benefits it may have. The potential for disposal of leachate, with or without pretreatment, directly to a local POTW via sewer connection should also be evaluated. Finally alternative leachate transportation schemes, such as the use of the nearby rail system, should be evaluated.

EPA's Response: Leachate treatment and disposal options were evaluated in the FS. These options will be further evaluated in the design phase of the remedial action. Leachate discharge to the Billerica POTW was not retained for consideration because of a moratorium on sewer hook-ups at that facility. Off-site options for transportation of leachate will be evaluated during design.

3. Technical Comments

Comment a: DEP notes that all of the substantive requirements that would be needed for the landfill gas collection/flare system to obtain DEP Division of Air Quality Control (DAQC) final approval should be implemented as part of EPA's selected remedy for the site even though, under CERCLA, no DAQC permit must be obtained.

EPA's Response: Massachusetts has identified its Air Pollution Control laws as ARARs that will be met at the Landfill. In addition, testing of the gas collection/flare system and an air quality study are

part of EPA's Selected Remedy. Proper long-term operation and maintenance of the system is an integral part of the Selected Remedy, and will include activities such as well field balancing on a regular basis. Submittal of as-built drawings, standard operation and maintenance procedures, and design data and calculations for the gas collection/flare system are all considered to be necessary elements for ensuring proper long-term operation of the facility. Obtaining this information will be a part of the design and implementation of the Selected Remedy. Testing of the collection/flare system as well as ambient air quality have been identified as ARARs and will be met.

Comment b: While DEP agrees that the Shaffer Landfill is not a likely threat to the Tewksbury well fields, DEP believes that only well MW-5 may be adequately positioned to actually monitor groundwater quality between the landfill and the wells. In addition, MW-5 is an overburden well and will not be effective in monitoring bedrock groundwater quality. DEP recommends that the 30-year monitoring program include adequate monitoring to assure continued protection of the Tewksbury wells.

EPA's Response: The long-term monitoring program is expected to include some existing wells and several new wells in order to provide a complete monitoring network. Final locations for screen depths for the wells will be determined during the design phase.

Comment c: DEP recommends that the expected leachate volume from the Landfill be evaluated in detail during the pre-design phase in order to design adequate leachate storage capacity. On-site storage volume must allow for several days storage in order to avoid daily truck/railcar transport.

EPA's Response: As noted earlier, further evaluation of anticipated leachate volume will be made as part of the pre-design and design activities. Sufficient storage capacity can be provided to accommodate a reasonable frequency of removal. It should be noted that the leachate collection system will be a passive system with no chance for overflow of storage units if removal is unexpectedly delayed.

Comment d: DEP agrees with EPA's proposal to design a leachate collection system to collect and treat only leachate seeps at this time, however the Department recommends that EPA evaluate the effectiveness of the cap in controlling leachate and protecting groundwater

over time before finalizing any decisions on extraction and treatment of groundwater. DEP also notes that the FS conceptual design should be revised to include an impermeable barrier at the base of the trench for the leachate collection toe drain.

EPA's Response: Part of the purpose of the groundwater monitoring program is to provide data to assess the possible need for additional remedial action. An impermeable barrier will be included in the final design of the leachate collection trench.

Comment e: DEP does not agree that landfill slopes need to be upgraded to meet a 3:1 slope requirement, and references a 7-19-89 memorandum regarding the acceptability of 2:1 slopes on the south and west sides of the Commercial section of the Landfill.

EPA's Response: The selected remedy does not require that all Landfill slopes meet the 3:1 slope requirement, and provisions are made for enhancing the stability of the 2:1 slope areas.

Attachment A

Community Relations Activities at the Shaffer Landfill section of the Iron Horse Park Superfund Site

September 1984	EPA press release announces that $700,000 has been authorized for a study of the Iron Horse Park Superfund Site
January 1985	EPA press release announces a Remedial Investigation (RI) Workplan for informal public review and comment
June 1985	EPA issues a press release announcing that EPA representatives will be attending upcoming Superfund Action Coalition (SAC) meetings to present information on activities at the Iron Horse Park Superfund site.
August 1985	EPA releases a community relations plan describing citizen concerns about the site and outlining a program to address these concerns and to keep citizens informed about and involved in site activities.
October 1985	At two separate meetings, EPA official briefs the Billerica Superintendent of Public Works and members of the Executive Committee of the SAC on the status of the site.
December 1985	EPA releases a fact sheet to update the public about the initial RI activities occurring at the site.
1985-1986	EPA representatives continue to attend the public meetings of the SAC to update them on the progress of the initial RI.
July 1987	EPA issues a press release and placed a public notice announcing the availability of the Phase 1A RI and an upcoming public meeting to explain the results of the RI.
August 1987	EPA releases a fact sheet on the Phase 1A RI.
August 1987	EPA holds a public meeting to present the results of the Phase 1A RI and to answer questions from the public.
May 1988	EPA press release announces the availability of Technical Assistance Grants (TAGs) for eligible local groups. (The notice was prompted by EPA's receipt of a letter from the SAC indicating an interest in the TAG program. The SAC did not complete the application process for the grant, however)
August 1989	EPA press release and ads in local newspapers announce public meeting on preliminary RI results.
August 1989	EPA produces and distributes a Fact Sheet on the preliminary results of the Remedial Investigation at the Shaffer Landfill.
August 1989	EPA holds a public meeting to discuss the preliminary results of the Shaffer Landfill RI
December 1989	EPA issues a press release announcing the

	availability of the RI for the Shaffer Landfill.
July 1990	An EPA press release announces the availability of a TAG for interested local groups (This announcement was made because the SAC did not follow through with it's initial application for a TAG)
December 1990	EPA issues a press release announcing a meeting and hearing to discuss the Proposed Plan and Feasibility Study for the Shaffer Landfill
January 1991	EPA distributes copies of the Proposed Plan to its site mailing list.
January 1991	EPA holds a public meeting on the Shaffer Landfill Proposed Plan/FS.
February 1991	EPA holds two informal public hearings on the Shaffer Landfill Proposed Plan/FS.
May 1991	EPA issues and distributes to its mailing list a Supplement to the Proposed Plan for the Shaffer Landfill, proposing a new preferred alternative for Shaffer Landfill. The Supplement to the Proposed Plan also discusses impacts on floodplains by alternatives considered by EPA. A 30-day comment period on the Supplement to the Proposed Plan is also announced.

ATTACHMENT B

ENVIRONMENTAL PROTECTION AGENCY

In Re: Superfund Program
Shaffer Landfill, Iron Horse Park
Billerica, MA

HEARING HELD AT THE BILLERICA TOWN HALL AUDITORIUM, BILLERICA, MASSACHUSETTS ON FEBRUARY 5, 1991.

PANEL:

Margaret Leshen, EPA
Don McElroy, EPA

Elizabeth M. Brooks
Court Reporter

CATUOGNO COURT REPORTING SERVICES, INC.

1365 Main Street
Springfield, MA 01103-1615
(413) 732-8100

40 South Street
Worcester, MA 01608-2019
(508) 752-0640

66 Long Wharf
Boston, MA 02110-3610
(617) 723-0640

Pittsfield, MA (413) 443-7263
Hartford, CT (203 525-3097
Northampton, MA (413) 586-3586 evenings
TELECOPIER (413) 739-4226

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David L. Johnson	26
Tony Bonacci	27

* * * * *

(Hearing convened)

MS. LESHEN: We're going to get started. Good evening. I'm Maggie Leshen. I'm Section Cheif for the Superfund Section and I'm going to be the moderator for this meeting. I'm going explain the procedure we're going to be following. Basically the meeting is going to be divided into three parts. During the first part, Don McElroy, the site manager, is going to give you a formal presentation about the proposed plan and preferred remedy. Then we will be taking formal comments into the record. If you are going to be making a formal comment this evening, you need to fill out a small index card or if at any time during the hearing portion of this meeting you decide you want to make a formal comment, you need to either go and get a card or let someone know in the back of the room that you want to

make a formal comment and they will get you a card.

After everyone's done, we'll close the public hearing and we'll open up the meeting to any questions and we'll try to respond to any questions you might have this evening.

We have extended the public comment period until March 16. So what that means is, if at any time if you have questions or comments you can contact the site manager, but we must receive your written comments in our office by March 16th and they should be addressed to Don McElroy. The address is on back of the proposed plan available at the desk.

We have also made a decision to hold a public hearing in this very room at 7:30, February 19th. That is two weeks from tonight. We are going to be following the same format as this evening but normally at that point we

will have more comments entered into the record.

I want you to understand that all the comments received this evening in the formal part of the hearing, any comments received in writing prior to March 16th in our office and any other comments received will be responded to in a Responsiveness Summary which will be attached to the Record of Decision or decision document for the remedy at the Shaffer Landfill site. Copies of this document will be available at the library and at the office in Boston, and the address and information as to when the building is open are on the proposed plan.

We have with us this evening the EPA project manager Don McElroy as well as Dale Young, the state project manager.

Does anyone have any questions on how the meeting is going to be run this

evening? If not, I'm going to ask Don McElroy to give a short presentation about the proposed plan.

MR. MCELROY: The United States Environmental Protection Agency has proposed a cleanup plan, referred to as the preferred alternative, to address contamination at the Shaffer Landfill, Iron Horse Park Superfund Site in Bellerica, Massachusetts. The proposed alternative is EPA's preliminary selection of a remedy and may be changed if public comments or new information is presented to EPA during the public comment period that significantly affects EPA's evaluation of the alternatives.

After evaluation of all eight alternatives developed in the Feasibility Study, EPA proposes reconstruction of the top portion of the existing landfill cap and the collection portion of the existing landfill cap and

the collection and off-site treatment and disposal of leachate. Cap reconstruction would be achieved by adding fill and regrading to achieve a minimum 5% slope on the top, flatter areas; installing additional low permeability material; installing a new 6-inch drainage layer; reinstalling the topsoil layer; and reseeding the disturbed areas. Leachate collection facilities would be constructed, operated, and maintained. Leachate would be transported off-site for treatment and disposal. Improvements would be made to the existing surface drainage system. The cap, the surface drainage system, and the landfill gas collection/flare system would be maintained and monitored, and any necessary improvements would be made. A site perimenter security fence would be constructed. Groundwater and surface water quality would be monitored.

If public comment and further information change EPA's evaluation of this or any of the other alternatives, EPA may decide on another alternative for its final selection.

I'd like to quickly run through the other alternatives evaluated in the Feasibility Study.

Alternative 1 is the no action alternative under which no further work at the site would take place

Alternative 2 would complete the existing cap by adding fill to achieve a 5% grade and reconstructing the overlying low permeability layer. This alternative also would include; maintenance of the cap, surface drainage system, and landfill gas collection/flare system; construction of a site perimeter fence; and monitoring of the gas collection/flare system and surface water and groundwater quality.

Alternative 3 contains the same

features as Alternative 2 in terms of completion and maintenance of the landfill cap. In addition, Alternative 3 would improve the existing surface drainage system; construct, operate, and maintain leachate collection facilities; and transport leachate off-site for treatment and disposal.

Alternative 3A contains all of the features of Alternative 3. In addition, Alternative 3A would construct, operate, and maintain a groundwater extraction system along the eastern side of the landfill; construct, operate, and maintain an on-site system for treatment of groundwater and leachate; and discharge treated groundwater to surface water.

Alternative 4A contains all of the features of the Preferred Alternative. In addition, Alternative 4A would construct, operate and maintain a groundwater extraction system along the

eastern side of the landfill, construct, operate, and maintain an on-site system for treatment of groundwater and leachate; and discharge treated groundwater to surface water.

Alternative 5 would completely reconstruct the entire landfill cap to meet EPA's recommended final cover design standards for hazardous waste landfills. This alternative would also provide the same maintenance, monitoring, and perimeter fence as the other alternatives.

Alternative 5A contains all of the features of Alternative 5. In addition, Alternative 5A would construct, operate, and maintain a groundwater extraction system along the eastern side of the landfill; construct, operate, and maintain an on-site system for treatment of groundwater and leachate; and discharge treated groundwater to surface water.

MS. LESHEN: We're now going to start the formal comment portion. We're going to ask that you come forward.

The first person will be Carl Moore.

MR. MOORE: I'd like to ask a question first. I'd like to ask what you people based your decision on as far as selecting a number, a number 4, a number 5. Was this from an engineering study that was done here?

MS. LESHEN: This is the comment period. We're not responding to questions right now.

MR. MOORE: Okay. Well, I have been in contact with this landfill for a very many years here and I am an abutter to Content Brook. I'd like to make it very clear to you people that there have been people drinking water out of the acquifer there. There have been fish -- like on my property, which has deteriorated over a period of years.

There have been -- there has been a situation on my street where dogs have gone into convulsions and have died. In fact, I had a dog that drank water out of the brook, which I made public some time ago, that bled through the skin before it was put away.

The effects to the wildlife in the area, I feel, have been greatly affected and I feel that any attempt, any attempt at all, would have to be the best attempt, as far as cleaning up this site goes, that we can make, that just a mere cover over the landfill is not adequate under these circumstances.

Some of the trips to the landfill that I found -- I found there they had excavated materials down into the water table, or surface water, lying completely visible. We have bottles of chemicals, of drums which may well have been chemicals. Therefore I feel that very strongly that you're going to need

groundwater extraction and just about everything you've got on your list needs to be elected.

I have done an awful lot of investigation on the landfill and one of the things that I have looked at has been the breakout of leachate into Richardson Pond, and I have investigated the B & M Railroad limits, which are record copies of drawings, as to when and how that railroad was constructed. I have found that there has been a breakout into Richardson Pond.

As everybody knows, in the past I have seen where there has been an erasure on the linen [sic] and I have recently visited the B & M and looked at the particular drawings in the past week.

I feel that a great part of the decision that you people have made here has really not been done on the sound engineering studies. I'm looking at a

bedrock possibility here, where we talk about fractured bedrock, and on GHR's report that I have here in front of me, I believe that on -- I could give you the page right now -- they say that we should have bedrock boring back previous to this, and I have seen -- as far as I know -- I don't know if there are any bedrock borings at this point but we do talk about fractured bedrock. Now, if we have fractured bedrock, that's all that much more reason to protect Cook Street wells. We need to make an attempt to stop the contaminants from coming out of the landfill and over into Cook Street wells.

Also I believe that any construction plans or drawings that are done must and should be reviewed by the town and its engineers. Also I believe that all -- that all of the people involved here, there should be some groups made up that -- you know, I'm

being honest with you.

After as many as years as I've been involved, I'm going to talk -- there should be some people assigned here that have some public interest in the town and the landfill to see that this thing is kept up and all of these, that the cap is maintained, the leachate system is installed for extraction, that that is maintained and periodic reports made from us back to the government, again, because I really feel as though ten years down the road there are a lot of people that are going to forget this mess.

We have a lot of problems in that landfill that's got to be settled and leachate into the groundwater and I feel it is a must. It's not a question as to if we should do it, we must do it. Thank you.

MS. LESHEN: The next person I'd like to call is Helen Knight.

MS. KNIGHT: I want to start by talking about two of my favorite subjects, M & M's, monitoring and maintenance. Both of them have failed us in the past. Unless we have a contract with penalties or bonds attached, it isn't going to be worth anything. I think we're a part of such a contract. I believe I am and I want to know that these things are going to be monitored and that they are going to be maintained as the plan says. We have too many times had things promised to us that never come about. I agree with the previous speaker, Carl Moore, about the groundwater.

For fifteen years four families drank water out of the wells that were in the acquifer of the landfill. No one knew anything about it. One of the problems we have in the town now is a lot of new people here who do not read a local newspaper. Three neighbors I have

closest to me do not read a local newspaper, do not know what is going on. There is nothing to stop anyone from coming into the town and driving a well on the property and drinking water out of the well. Unless we contain that groundwater on-site I see no other way to protect the health of the people of Billerica if we cannot do that.

I'm intrigued by the write-up of the cancer risk in here. I'm told that if I drank the water on the dump site that I'd have two chances in a hundred to get a cancer, but only if I drank two quarts for seventy years. Maybe this is the way these cancer risks are listed, I don't know. It seems incredible to me that we have to put down two quarts and we have to talk about seventy years. Are we to conclude that if you drank one quart for seventy years nobody would have cancer? I think what we're saying here is that there is a slight risk of

cancer and I think if you got it, you wouldn't care if you were one in a million or one in ten thousand or whatever. This again I think points out that we do need that groundwater kept on-site. We cannot -- there are people who use these wells for their lawns and for things like that and we cannot keep children from playing and possibly drinking it, and although I would like to see these lists in a little more realistic terms than two quarts for seventy years, I think we have to face the fact that there is a slight cancer risk, a risk no one wants to take.

I'm concerned too about the venting system. I'm beginning to be very sick of reading that the venting system doesn't work because, what a surprise, it is a dump site. Venting systems are made for dumps, I think, and dumps settle and isn't there any reason why we can't plan for this or correct it or

periodically change it? I'm not suggesting that it be put on elastic, but it does seem to me that springs or something would solve this problem. Anyone who makes a venting system should be able to do that. We've had that venting system now about three years and it isn't working. I don't understand why the engineering can't be changed to make it work.

I'm also disturbed too when I read in here that some of the tests are 1987 and '88, I believe, in the rounds of testing. We're talking about our lives and our welfare here. Can we not have a complete new set of tests?

I think we have a problem too that we're afraid some of the containers of the materials in that dump are eventually going to deteriorate and some of that is going to get into the groundwater or into the leachate. Can we not have some tests that are -- that

are final? Now, I'm assuming that over the years they'll change but at least we'd get a better picture if we did that.

Now, I'm also concerned there is surface water that has not been tested. I've brought a sketch up here in rough form of Gray Street, right close to the railroad tracks. On each side of the street there are two ponds and I see children playing in one of them all the time. I don't think these have ever been tested. Surface water. There is a large pond in between 90 and 100 Gray Street that has never been tested. There is a good-sized pond besides 113 Gray Street that has never been tested, at least there has never been a record of it. I think that should be done. We should know about that, I think.

I'm puzzled too about why only the middle of the cover is going to be repaired. Engineering is not my

department but it does appear to me that the problems are on the outside of the cover, not in the middle. I see leachate breakouts in different places and I see it's out of compliance with state plant limitations on three sides, I believe, and I cannot really understand why we would just correct the middle, which looks pretty good to me. It seems to me the only way to handle this is a complete cover.

I'm also interested in that breakout at Upper Middle Pond that I know Carl Moore spoke about. There's no question about it. The water is going under the tracks and into the pond. I'm sorry, Richardson Pond you call it. I believe there are culverts there and that this should be investigated. Under no conditions should we allow that pond to be as contaminated as it is.

We found -- our consultant found tritium when he did some testing in

pools at the rear of the test site. We have the test papers with us. In 1983 he did the testing. I'm suggesting too that this is something that should be investigated. Admittedly it was tritium, which I realize is not very strong in radioactivity, but it was seven times the ambient level. There's no question about it, somebody dumped something there that shouldn't be there. Do we know that there is anything else there in another section of the dump? I think we should find out.

MS. LESHEN: The next person I'd like to call is John Morris.

MR. MORRIS: I understand you won't answer questions. Is that correct?

MS. LESHEN: Yes.

THE WITNESS: Then I have no way of asking if we have actually found elevations on any map. I do have a map here that was done in 1971. It's the town engineering map and it clearly

shows that the landfill is in the wetlands, as we all know, and that it was excavated and actually material was taken out and the landfill base was extended further into the wetlands, as these pictures here indicate. I believe that excavation may have been somewhere in the order of fifteen to twenty feet of fill taken out of here, as indicated by those maps, and that now the landfill, I believe, is someplace around elevation 178.

As you can see from these pictures -- I don't know. I got these from Carl. Do they have copies of these?

MR. MOORE: Yes.

MR. MORRIS: I think the pictures probably tell most of the story. Let me just reiterate a few things.

The board of health is very concerned about -- the first thing that we would prefer is a total cap reconstruction. As indicated earlier at

a meeting with the board of health, the cap that is currently on the landfill is not in compliance with the 1984 court order. Secondly, there is nowhere in the CEM's plan that shows a direct hydroelectrical connection to keep Richardson Pond from the landfill. Now, it's a fact that there are several culverts along the tracks which connect the pond with the landfill, I believe, and I believe that the board of health would like to see vertical barriers installed and the containment system in manipulating and confining and channeling this groundwater to an extraction point and a greater in-depth groundwater system than what is being proposed under the EPA's alternatives.

We should not take any risk at all which would contaminate Tewksbury's well water. I don't believe that the current system being proposed will protect that, will protect Tewksbury's wells the way

it needs to be protected.

Leachate, again, should be treated off-site, collected and treated off-site.

There are several points that several other people are going to be making about the traffic, the use of the transportation methods the EPA will use. I prefer we use the rail system.

The other things are the venting system and the flare system. Before we even begin the total cap reconstruction that should be in place and working at 100 percent efficiency before we go toward it. It is obviously not doing the job now. We should correct that problem before we go and do the cap.

The other thing that I would like to mention or comment is that I wish that the EPA had granted us this to be the first meeting instead of the second meeting. I understand we have had a thirty day extension. I think several

town officials indicated to the EPA they were not happy with that. I don't know if they are all happy with the extension. That's about it.

MS. LESHEN: The next person is David L. Johnson.

MR. JOHNSON: The statement that I'd like to make is relatively to the basic data that you used in arriving at your solution, and one of those basic data points was the impact on the surface water. A lot of the testing of the surface water which was done was provided in reports and I read some of these reports and one of them says methylene chloride was detected in the at 1300 parts per billion and was therefore was considered lab or field contamination, therefore they didn't believe them. That was also the case for acetone, which I think they found 800 parts per billion or something of that sort.

I would like to point out to you that we had testing done in 1983, and this was done by Cambridge Analytic, a very well known company, and we had the testing done in accordance with law because we intended to take the state and town and everything to court to get the place cleaned up. What they did was they ran a calibration cycle on their equipment. They ran the sample through and then they re-did their equipment to make sure that they were maintaining calibration during the test. Our results, which I'll give to you, indicated 1100 parts per million of methylene chloride, 850 parts per million of qualine [phonetic].

I think that you've got to go back and look at the very base information that you have made your decision on before you come out with your record of decision and I submit these documents to you which detail our test results.

MS. LESHEN: I'd now like to call Tony Bonacci.

MR. BONACCI: My name is Tony Bonacci and I'm an abutter of the landfill and I just more or less would come up here to reiterate what my neighbors said, Helen, Carl and Dave, and because I've been working with Helen with this going on ten years and trying to correct the problem and it's been a ten long years. Fortunately, I'm glad they have got abreast of it and kept all the information and kept me in touch.

Unfortunately I was one of the abutters who had a well, and it was active for five years, that I drank out of it. My family drank out of it, and in the past fourteen months I have developed kidney failure, and I can't say it is to this or to the drinking of the five years, but it's something that I've got to live with for the rest of my life 'cause I don't know, and is there

other people around who are getting sick and don't know why?

And just again, I'm a concerned abutter and somebody -- I don't care if it costs 50 million dollars, we want the problem done correctly and we want it done right and right away. Thank you.

MS. LESHEN: Would anyone else like to make formal comments?

I want to again mention we are going to be holding another public hearing to give you the opportunity to enter your oral comments into the record February 19th, two weeks from tonight, in this room, at 7:30.

Any comments that were received this evening thus far that were read into the record, any comments to be received orally on the 19th and any comments we receive in writing in our office prior to March 16th will be responded to in the document called the Responsiveness Summary attached to the

Record of Decision and will be considered during our decision-making process.

We do encourage you to submit written comments, to come back on the 19th and make additional comments and for the people to make comments at that time.

If you have any questions, we're going to be staying around this evening to answer any questions, you can be called on, and if thre is any other way we can be of help, let us know.

If I don't hear anyone wishing to make any additional formal comments, we will now close the record. At this point no further comments will be entered into the record this evening. Any comments you want addressed in the future will have to be entered into the record on the 19th or submitted in writing. The record is now closed.

ENVIRONMENTAL PROTECTION AGENCY

I, ELIZABETH M. BROOKS, Registered Professional Reporter, do hereby certify that the foregoing testimony is true and accurate, to the best of my knowledge and ability.

WITNESS MY HAND, this 22nd day of February, 1991.

Elizabeth M. Brooks

EMB/ed

ENVIRONMENTAL PROTECTION AGENCY

In Re: Superfund Program
Shaffer Landfill, Iron Horse Park
Billerica, MA

HEARING HELD AT THE BILLERICA TOWN HALL AUDITORIUM, BILLERICA, MASSACHUSETTS ON FEBRUARY 19, 1991.

PANEL:

Margaret Leshen, EPA
Don McElroy, EPA

Elizabeth M. Brooks
Court Reporter

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(Hearing convened)

MS. LESHEN: Good evening, I'm Maggie Leshen. I'm chief of the Connecticut Superfund section, and I'm going to be running tonight an informal public hearing for the Iron Horse Park, Shaffer Landfill Site. I'm going to explain very briefly how this will be run, and I will remind you that it will be run in the same manner as our February 5 hearing.

Basically tonight we will be dividing the evening into three parts. During the first part, Don McElroy, the site manager, will be giving a very brief presentation about the proposed plan. We will then be taking formal comments, which, if you intend to make one, you need to fill out one of the cards that we can get you from the back and I will call on you and we will ask you at that point in time to come up to

this mike which is hooked to a recorder as well so we can get your comments entered into the public record. We will not be responding to those comments this evening. The comments that were received February 5, the comments that are received tonight, as well as comments that are received in writing prior to the end of the public comment period, which has been extended due to your interest, to March 16, the comments that are received in writing in our office by March 16, all the comments will be responded to in a Responsiveness Study, which will be attached to a Record of Decision, which will be a decision made on this site based on public and state comments that have been received during the public comment period.

Does everyone understand how this will happen?

I am going to tell you that we will

limit the first round of comments, 'cause I don't really know what people have, to approximately ten minutes. That way we can get to all the people that have requested to make a comment, so that everyone does have a chance. In the event someone wants to read a lengthy comment into the record, we will stay around for any comments that anyone has, but I'm going to limit the first go-around to ten minutes so that everyone will have a chance to speak into the record if that's so desired this evening.

As I said earlier, the comments also can be submitted in writing to our office in Boston, and the address is on the proposed plan that was at the front desk when you came in. If you need one you can just let us know during the evening, so that you can submit these comments in writing by March 16.

As I said, Don will give a very

short presentation on the proposed plan, and then we will get started with these comments. After we finish the formal comments, we will stay around for entertaining the questions that you might have remaining.

Now Don will give you a very short presentation on the proposed plan.

MR. McELROY: Good evening. I just wanted to run through the process that we've gone through up to this point and quickly run through the alternatives in the proposed plan before we open the floor for comments.

The Environmental Protection Agency has proposed a cleanup plan referred to as the Preferred Alternative to address contamination at the Shaffer Landfill, Iron Horse Park Superfund Site in Billerica, Massachusetts. The Preferred Alternative is EPA's preliminary selection of a remedy and may be changed if public comments or new information is

presented to EPA during the public comment period that significantly affects EPA's evaluation of the alternatives.

After evaluating all eight alternatives developed in the Feasibility Study, EPA proposes reconstruction of the top portion of the existing landfill cap and the collection and offsite treatment and disposal of leachate. Cap reconstruction would be achieved by adding fill and regrading to achieve a minimum five percent slope on the top, flatter areas; installing additional, low permeability material; installing a new, six inch drainage layer; reinstalling the topsoil layer; and reseeding the disturbed areas. Leachate facilities would be constructed, operated, and maintained. Leachate would be transported off-site for treatment and disposal. Improvements would be made to the

existing surface drainage system. The cap, the surface drainage system, and the landfill gas collection/flare system would be maintained and monitored, and any necessary improvements would be made. A site perimeter security fence would be constructed. Groundwater and surface water quality would be monitored.

Again, if public comment and further information change EPA's evaluation of this or any of the other alternatives, EPA may decide on another alternative for its final selection.

I'd like to quickly run through the other alternatives evaluated in the Feasibility Study. Alternative 1 is the no-action alternative, under which no further work at the site would take place.

Alternative 2 would complete the existing cap by adding fill to achieve a five percent grade, and reconstructing

the overlying low permeability layer. This alternative also would include maintenance of the cap, surface drainage system, and landfill gas collection/flare system; construction of site perimeter fence; and monitoring of the gas collection/flare system and surface water and groundwater quality.

Alternative 3 contains the same features as Alternative 2 in terms of completion and maintenance of the landfill cap. In addition, Alternative 3 would improve the existing surface drainage system; construct, operate, and maintain leachate collection facilities; and transport leachate off-site for treatment and disposal.

Alternative 3A contains all the features of Alternative 3. In addition, Alternative 3A would construct, operate, and maintain a groundwater extraction system along the eastern side of the landfill; construct,

operate, and maintain an on-site system for treatment of groundwater and leachate, and discharge through the groundwater to surface water.

Alternative 4A contains all the features of the Preferred Alternative. In addition, Alternative 4A would construct, operate, and maintain a groundwater extraction system along the eastern side of the landfill; construct, operate, and maintain an on-site system for treatment of groundwater and leachate; and discharge treated groundwater to surface water.

Alternative 5 would completely reconstruct the entire landfill cap to meet EPA's recommended final coverage design standards for hazardous waste landfills. This alternative would also provide the same maintenance, monitoring, and perimeter fence as the other alternatives.

Alternative 5A contains all the

features of Alternative 5. In addition, Alternative 5A would construct, operate, and maintain a groundwater extraction system along the eastern side of the landfill; construct, operate, and maintain an on-site system for treatment of groundwater and leachate; and discharge treated groundwater to surface water.

MS. LESHEN: Thank you, Don. And now we will get started on the formal hearing part. And we do have the cards, and I will at this point in time read them in order for the people that signed up as they came in. And the first person is Helen Knight.

MS. KNIGHT: First, we are pleased to have another opportunity to state our case. I confess that I live on Gray Street, in the neighborhood that is severely impacted by the dump. I'm the third generation in my house. And I very much doubt that any of my relatives

back in the family ever thought the day would come when the old blueberry swamp would be a threat to the neighborhood. Unfortunately that day has come. Contaminated surface water flows into our neighborhood in Content Brook. Contaminated groundwater probably flows under our houses, and contaminated air with the westerly winds blowing into the neighborhood entertains us periodically. And this is through no fault of ours. So we have a few demands, and we think we have a right to have some demands.

First of all, before any of this is done, let us talk about funds for this. We need a bond, a financial commitment, with penalties, some kind of assurance that the job will be done; and that if problems occur that they will be addressed. Too many times individuals and agencies have failed us.

It has been twenty-five years in November since this odyssey started.

And I'm entertained that we're congratulating ourselves now that we've done the paperwork that we're going to get a fence. Isn't that remarkable, in this day and age. Twenty-five years later we're going to put a fence around it. Congratulations to us.

First of all, too, we need complete, up-to-date testing of surface, groundwater, air, everything. It is not enough to base this decision on 1988 testing; and by testing a well here and a well there. Every well. Surface water, groundwater, every test we can give to the air. Then we know where we stand.

When we look at the proposed plan, there's good news and bad news. The good news is -- the best of the news is the leachate collection system with off-site treatment and disposal. That answers a real demand. I hope we will think too of the railroad, possibly tank

cars on the railroad for that purpose, if it can be worked out. And in spite of the fact that we waited twenty-five years, I am glad to hear that the fence is going to be a reality. I hope it will be done soon, before the twenty-five years are up. November is the cut-off date. Not only that, I hope it will be sufficiently labeled so that anyone who comes to it will know that this is a site they should not be in.

I am pleased to hear that there's going to be maintenance of the cap, the drainage system, and the venting system, but the bad news is, I don't think the venting system is working. So you can't maintain it until you make it work. Get it working first. Then maintain it. It is not working. Tonight there is an odor problem.

Second, I cannot see how we can get by complete with fixing up just the center of the cap. The problems are

around the edges, where there are breakouts of leachate and where it is, on at least three sides, far out of compliance with state flat limitations. I do not know what the federal flat limitations are, but the state ones are not met. It's two to one, instead of three to one. I don't know how we address that. It should have been addressed before. It wasn't. It is a problem. We cannot solve it, we cannot live with it, unless we have a complete cap.

And as I said before, we cannot maintain the venting system unless it is repaired. I don't know what's wrong with it. That's not my department. But it isn't working. I cannot believe either that we're talking about leaving Upper Mill Pond, Richardson Pond, with a breakout of leachate, I believe the most serious breakout of leachate, and not addressing that problem.

We've been told in elaborate terms that it is not possible for things like fragmented base rock and things like that, when we know that there are culverts under there. Those must be straightened out. They must be sealed. If that poses a problem about drainage, then there must be some other solution worked out, but when you have a culvert and a dump on one side in a swamp, dump below the surface of the water, and you have a pond on the other side of the track, and they're equal in height, you know where the contaminants are going to go. So we do need to fix that up.

And finally, I'm very concerned about the groundwater. We found there were four families drinking water out of wells in this aquifer. They have since been hitched up to the town drinking water supply. One family, however, drank water for fifteen years out of that, and incidentally, there are two

cancer cases in that family. I'm another cancer case, incidentally. Twice I've had it. But we've not done a health study, and possibly these are not connected. I don't know. But I cannot see this stuff going into the neighborhood, under the houses, and into the aquifer of Content Brook and Shawsheen River and do nothing about it. It must be addressed somehow.

MS. LESHEN: Next I'd like to call Julie Bonacci.

MS. BONACCI: My name is Julie Bonacci. My husband spoke here last meeting, and I'm here to represent our family tonight. We live near the landfill. We live on Gray Street. We've been there for ten years. When we bought the house, we didn't realize there was a landfill behind us. It wasn't until we were at the dump, and we could see the top of the roof of our house, that we realized the kind of a

situation we were in.

We were excited about the house at first. It had a well and it was good tasting, which we thought it was. And we went ahead and kept drinking the water. I went through two pregnancies drinking the water. And fortunately my children are healthy at this point. But we have had illnesses in the family. My husband has kidney failure, and so there are different situations that we have had to confront thinking about the landfill and thinking about the long-term effects that it has had on us.

Several times the children wanted to take walks and we keep telling them you can't go walking through there. It's not safe, it's dangerous. And with the fence, it would be very good to tell them, and to realize the danger of going back there, and keeping them out as they grow older, and being teenagers, and realizing that they can't go back there.

So the fence is exciting. And I wish it came a long time ago.

We've been on the Super Action Committee for ten years with Helen and the neighborhood and it has been a long process. A lot of anxiety has come throughout all of this, and we all hear the news and all the environment problems, and we have one in our backyard, and I don't understand why it takes a community, the government here in their community, and their problems, such a long process, and just getting to the point and getting the job done.

I just want to add that this cap needs to be completely capped. If we do not do that now, then there are going to be more problems and we're going to be facing the same situations and back at the table again and discussing what we should have done back when. So the cap needs to be completely done, and everything that Helen said about the

drainage and the leach, I also back that up a hundred percent. And that's all I'd like to say at the moment. Thank you for your attention.

MS. LESHEN: The next person I'd like to call is Barbara Morrissey.

MS. MORRISSEY: As I left my house tonight I was also assaulted by the noxious odors coming from our landfill, and it made me even more determined to come and speak tonight.

From the beginning, the Shaffer Landfill has received inadequate monitoring. In 1966/67, Gray Pond Realty received a permit from the Department of Natural Resources for the operation of the landfill. The permit required a liner. This was not done, yet the permit was not revoked. Now we are here to fix this problem. Maggie Leshen stated at our last meeting of February 5 of 1991 that liners are the norm in landfills, and caps are the

fixes. We are trying to fix a major problem and should do so doing the most appropriate means available to us today. The missing liner has resulted in the migration of the landfill contaminants, via the leachate, to groundwater and surface water. This migration is the primary threat to human health in the environment.

It seems reasonable that the reduction and control of this leachate production should be the number one priority. Leachate production is directly proportional to the amount of water that is able to penetrate the landfill cap and filter through the waste. The reduction or elimination of this infusion through the cap must be stopped.

The existing cap does not even meet the requirements of the 1984 consent agreement. I quote, from the Superfund sheet of August 1989: "The depth of the

cap of the clay layer may not meet the agreement's requirement, and the approved specifications on the top and side slopes of the landfill. In addition, the permeability of the clay has not been verified to meet the EP requirements. It is questionable whether the topsoil layer is thick enough to support adequate vegetation."

How can this cap reduce the human and environmental hazards caused by the leachate production if the current cap's design is faulty and the cap is inadequate. The EPA must properly cover the entire landfill and not just the top sixteen acres if the inadequacies of the past are to be corrected. If we are given the quick fix being proposed by the EPA, the basic problem will not be corrected, and the result will be the continued leachate production and migration. To stop this continual pollution, the EPA recommended cover

design, in Figure 5-5 of the Final Draft Phase Feasibility Study for Hazardous Waste Landfills, must be applied to the total area of the Shaffer Landfill.

The problems we have today are the result of lax monitoring by the responsible agencies and a lack of proper O & M contracts on the cap and gas venting systems. Ongoing O & M contracts are necessary to ensure the future integrity of the landfill cover and venting system. Gray Pond Realty has demonstrated its inability to provide such contracts. To guarantee the money is available for the future maintenance requirements of the landfill, a trust fund or bond must be created. With a proper cap, the O & M contract, and the financial guarantee, leachate production should be controlled and leachate migration will be reduced.

The leachate that is still being produced must be collected, contained,

and treated off-site as proposed in the Feasibility Study. There must be a plan developed in case there is a leachate spill. If possible, the leachate removal should be done by railroad and not over town roads. Truck routes through the neighborhood would have a negative impact and create many potential problems. It has also been discovered that four culverts connect the landfill to Richardson Pond. The remediation must include permanent closure of these culverts to stop their further surface and groundwater contamination. The impact on groundwater will be decreased if the contaminants can be kept on site. Total cap reconstruction would be the most effective means to accomplish this.

Before final closure begins, we need a round of current test samples. This would provide us with initial baseline values of all hazards,

hazardous chemicals, at the landfill. By routine, scheduled retests the migration of chemicals will be monitored. Threshold values must be set, and public notification should be a requirement, that these values are met or exceeded. Predetermined actions must be designed so appropriate action can be implemented immediately. If an escrow account was in place, the money would be immediately available to start the appropriate corrective measures. Without the money, the Shaffer's record of slow and inappropriate action will again be the norm.

To restate, because the landfill has no liner, we want the best remedy available. That includes a total cap reconstruction, leachate collection and off-site treatment, and groundwater monitoring at frequent, regular intervals. If the primary goal of the action is to reduce the hazard to human

health in the environment, nothing less will be appropriate or acceptable.

MS. LESHEN: Thank you. The next person I'd like to call is Robert Williams.

MR. WILLIAMS: Good evening. My name is Bob Williams, and I own Williams Energy Systems. I'm in the process of doing an environmental and energy project with the Shaffer Landfill. I'll be using the gas that is currently being flared on site with all the controversy and problems associated with the landfill, that have been ongoing in the years. I'm going to be stepping into the middle of this problem to bring an energy project online that is good for the environment. In fact, this is one of the few times when something good can come from a Superfund site. This might strike all of you as a bit ludicrous. It's like talking about the Lebanese government. It's an oxymoron. It

really doesn't make much sense. But this is a good project because it can improve the problems that are already existing. What will be improved is not only the environment, but will be the energy resources that come out of the gas that's being flared.

In case any of you are wondering what landfill gas is, it is methane, the same as natural gas. When the landfill is capped, oxygen-free, anaerobic bacteria begin eating away at cellulose products, anything made from wood; and their waste produce becomes methane. When you have anaerobic bacteria eating away at a million tons of rubbish, it produces a tremendous amount of that gas. In fact, energy equivalent of what's packed away in that landfill is equal to two supertankers. And of course I need not remind you of the situation we're in and how an energy resource like this would do really good

things for both the country as a whole as well as the environment.

There are two problems associated with landfill gas. Gas migration through the soil is the most dangerous. The gas can seep into houses and basements and cause explosions if ignited. In Lowell they have this problem at their capped landfill. There three businesses on Westford Street have been closed and vacated because of the gas migration problem there.

The other problem is environmental. Methane is an ozone destroyer, and in regards to the greenhouse effect, it holds twenty times the heat, molecule for molecule, as carbon dioxide. Flaring the gas is a good way of reducing this problem. In fact, an EPA study on reserve at the Billerica library lists the results of the Alliance Technology Report and Recommendations. The results of the

analysis and testing after the gas is flared is that it meets DEP and EPA requirements and recommendations, and it is recommending that the flaring continue. I will be taking that one step further. I will put a slight vacuum on the well system to suck the gases out of the ground to prevent the gas from migrating and odor problem seeping into the air, causing additional atmospheric destruction. I will also be dehydrating the gas so when it burns it'll burn hotter and cleaner. This gas is now going to be used on site. It will be pumped by pipeline for industrial cogeneration use at Iron Horse Park. The pipeline will cross only the industrial property of the energy users. It doesn't matter to my project what the final solution to the capping or leachate problems are. I can draw on the existing resources without interfering to the future solution, and

I will be meeting all DEP and EPA requirements. I cannot fix the Superfund puzzle, but I can take one piece of that puzzle and I can make it much better.

If you folks have any questions regarding my project, I live in Wilmington, and I'm listed in the yellow pages under Williams Energy Systems. Feel free to give me a call, because I'm going to be going ahead with this project in the next three to six months as I receive licensing and permitting. I should be able relieve a good part of the problems in regard to odor and migration of the landfill gas that is there right now. And I hope to have your support. Thank you.

MS. LESHEN: The next person I'd like to call is JoAnne Giovino.

MS. GIOVINO: 1981. 1981 was a very significant year for me. It was the year that I gave birth to my first

child, a daughter. And it also was the first year I was introduced to Iron Horse Park. I realized that being a parent was going to be a lifelong responsibility. I did not realize that being a watchdog for Iron Horse Park was going to become that too. Little did I think I'd be standing here ten years later, trying to convince the EPA to do the right thing. What is the right thing? Closing the dump the best way the first time around. This let's-try-this-first-and-see-what-happens policy just isn't acceptable. It seems to me that your preferred plan is a Bandaid solution to a serious problem.

We hear a lot about maintenance and monitoring and I agree these are two essential elements of the closure. However, Alternative 4 in my opinion depends too heavily on maintenance and monitoring. Time and time again history

has shown us, and our experience has taught us, that maintenance and monitoring are the very areas where Gray Pond Realty has consistently failed. It is my opinion that the solution chosen should be the one with the least amount of maintenance and monitoring because at best this is what we will get from Gray Pond Realty.

What is needed to achieve a community-acceptable solution? One, a total cap reconstruction. Strewn throughout the many investigative reports issued by the EPA, the integrity of the cap has been considered questionable, to say the least. The current cap has never been certified by the DEP, that it fulfills the closure compliance. Quite to the contrary, there have been many shortcomings pointed out, and I do not see the EPA addressing these flaws. EPA has told us that there are obstacles involved. And

I suggest that you throw out that cookie cutter solution, use ingenuity, creativity, and approach this with fresh new ideas.

Number two, I agree with Helen, you can't fix something when it doesn't work. A complete redesign of the gas collection and flare system has to be done. Maintenance is just not enough. The design and implementation is obviously flawed. The design must be fully reviewed and revamped. DEP has never accepted this design. It has only been tentatively accepted, and a grant has not been permitted -- I mean, a permit has not been granted. Excuse me.

I do agree with the EPA on the leachate collection and off-site treatment. I think that's an excellent idea. And I agree with the EPA on a site perimeter fence. I think it's necessary for site security. And I would also like to see a deed

restriction.

Like my fellow SAC members, I am going to talk about bonding and escrow accounts. Past experience has taught us never assume anything. We have to know that there is money put aside to complete work and follow through on the maintenance. Thirty years is a long time, and I believe the key players will change. We may still be here, but I doubt that Gray Pond Realty and you will be here. Billerica does not want to inherit this white elephant.

And finally, at this time I am requesting the EPA to initiate a natural resource damage assessment that's provided by CERCLA, in Section 107, Paragraph D, entitled Natural Resource Liability.

MS. LESHEN: And now I'd like to call on Richard Farren.

MR. FARREN: My name is Richard Farren. I live on Newport Drive, and

I've been a resident of Billerica for fifteen years. Some friends and neighbors in my neighborhood have brought the issue of the landfill and the EPA work to my attention, and it's been a concern to myself over the last several years.

I'm a family -- a father of two. I have two children approaching teen-age years, and Content Brook runs directly behind my property. Over the years we've been plagued with, in our neighborhood, the odor emanating from the landfill site. Content Brook has not been what I would call one of the most stable bodies of water. There are several different color variations coming from the brook, odors coming from the brook, and this has all been of concern to me.

I've only recently had an opportunity to review some of the material, but what I have reviewed is

fairly disturbing.

Number one, a prior speaker talked about a Bandaid approach, and certainly this reeks of a Bandaid approach. There are opportunities here to solve a problem, not just temporarily fix something that may go away in fifteen to thirty years. And there is a long history, as some of the previous speakers have spoken about. It's not a question where we can monitor or maintain. It's an opportunity where we should eliminate and correct, right from day one.

There's a concern about the cap, where it's a small percentage of the entire landfill. Not being an environmental engineer, but just common sense would tell you that the basic problems aren't necessarily at the top of the cap but certainly at the sides where the groundwater and Content Brook and Richardson Pond are. The sides are

where the biggest problems would be to a layman.

There are some good points in terms of the fence being constructed. The collection and transportation of the leachate is important. But beyond that, I'm concerned that there may not be enough testing used during the process or even at the start of the process. It does not sound like there are adequate testing results. Number one, they were last conducted in 1988, and I'm concerned about the area of testing. Content Brook runs -- I'm at least a mile away from the site, and again I have concerns with just my observations. What about further down on the stream? Is the water being tested that far away from the landfill? What about the soil in those areas? Is the soil being adequately tested, within, I would say, at least a minimum of a mile's radius?

I think there's a big opportunity

here, and it's a crucial opportunity that we must take advantage of. As the previous speakers have stated, there have been dozens of years that have gone by since this problem has surfaced, and I'm fearful that dozens of more years are going to be going by on the calendar before we actually get to a real solution. I would urge everybody involved that they reconsider, take a look at the best portions of all of the alternatives and try and correct that and come up with the best possible solution that'll start taking care of the residents of Billerica and Tewksbury starting from day one, not with the hope that something may be beneficial thirty years down the road. Thank you.

MS. LESHEN: The next person is John Morris.

MR. MORRIS: My name is John Morris, director of public health. I've been a resident of Billerica my entire

life, thirty-one years. At our last gathering, I mentioned to the EPA about the escavation of this property and the direct deposit of refuse into the water table. Well, since then the board of health has reviewed your documents, and we have developed our own preferred alternative. This alternative must include, but may not be limited to the following issues: The EPA must require (1) a total cap reconstruction; (2) repair and, if need be, replace or expand upon the current methane collection system; (3) containment, collection, and treatment of groundwater; (4) leachate collection and treatment; (5) proper operation and maintenance in place and properly funded; (6) a significant contingency fund to cover the cost of any surprises; (7) cleanup of Richardson Pond; (8) we need a significant escrow account for future repairs or work that may need to

be performed.

There is one lesson that we should all learn here tonight, and that is that we should learn from our mistakes. During the last ten years, the Superfund Action Committee and several other residents of this town have been trying to properly cap that landfill. Whenever we wanted to spend more money, we kept hearing about this infamous escrow account which had $700,000, which was to be used for leachate collection. There was no more money. We constantly heard that until we finally applied some pressure to politicians to get the fence up, and that is finally being done.

We should make darn sure that we either appropriate or secure the necessary funds from the responsible parties up front. It seems that the bottom line to this cleanup is the dollar amount. Well, there can be no dollar amount attached to anyone's

health. I am very concerned about the residents of this town and our neighbor, the Town of Tewksbury, and their well water supply. That's why I think that we need one hundred and ten percent, not one hundred percent, not fifty percent. And be sure that we have selected the best alternative to the cleanup of this landfill. Thank you.

MS LESHEN: The next person is Arnold Ventresca.

MR. VENTRESCA: I'm Arnold Ventresca, chairman of the Billerica Board of Health. I'd like to begin by saying that I think that the EPA should be the people who would recommend the most effective possible solution, at least initially. At least as to going in position, that's where you should be. It seems to me, though, that you are more concerned with cost than effectiveness. As laypeople, we look to agencies such as the EPA, the experts,

to seek the one solution that will be most effective in protecting the health of the public and the environment. I thought that was what the "P" in EPA meant.

We are not ready to accept your proposed solution. We want a complete reconstruction of the cap; containment and collection of the groundwater; extraction and treatment of the leachate; an effective methane control system; complete perimeter fencing and posting at the site and continuous monitoring; an operation and maintenance that will provide the necessary protection; also continuous community involvement in the monitoring process. Although at the last meeting you said that was not possible, I don't believe it.

Richardson Pond must also be part of the final cleanup of -- I expect the EPA to concern itself with the health of

the public and the environment, not the wallet of the polluters. Please remember that your real responsibilities are to protect the people and the environment. We will be the ones left to live with the situation once a solution is approved, not the EPA, and not the polluters.

MS. LESHEN: The next person I'd like to call is Brian Cangiamila.

MR. CANGIAMILA: Thank you. As we've all heard tonight from many speakers, the many people that have been involved with the problem up at Iron Horse Park, the Shaffer Landfill, and Richardson's Pond for many years, these people have been fighting for more than ten years to try to clean this problem up. Already one stop-gap solution has been proposed. A cap is in place, a venting system has been put into place, and none of these measures has dealt with the problem effectively.

I think that we all could agree that the process to introduce change in the future is a lengthy process. Already these people have been working for, as I said, ten years, to try to correct the problem, since the landfill has been shut down, and again we are going back to the process again, to propose just a patch to a solution that never works.

As the board of health spoke, and the director of public health has spoken, the town has set down some reasonable goals for a solution to the problem. As the many residents have expressed, many health hazards have been, have surfaced throughout the years, and the EPA and the Government's just proposing to repair something that's not worked. As Helen Knight mentioned earlier, we're looking at trying to maintain a venting system that doesn't work. We're looking at

repairing a cap that never served the purpose. And we're completely overlooking one of the most significant points that needs to be addressed.

In your earlier comment back two meetings ago, you mentioned that there were unhealthy levels of arsenic in the groundwaters. In your preferred plan, we're not even addressing the fact that the groundwaters that are migrating underneath the existing cap are not going to be extracted and dealt with properly. We're going to, under the proposed plan, allow those waters to continue to migrate and fester with whatever matter is stored under the landfill.

I don't think anyone in this room here can testify or certify what truly is buried underneath that landfill. Fortunately, I live on the opposite side of town, but as a state representative, I'm concerned for all of the people of

the town. Driving through that area at any point in the year there are horrible stenches that these people must live with. The venting system that's been proposed does not meet -- does not solve the problem, does not purify or eliminate that odor that permeates the air.

I would like to propose to the EPA to rethink the proposal, to go with one of the other alternatives, preferably alternative 5 or 5A, where the groundwater is addressed, totally a new cap is placed over the area, and that the groundwater is taken care of in a proper manner.

Trucking the water off-site by means of a truck further poses health hazards to all the residents of Billerica and any other community which those trucks pass through. We've seen in the last year significant, significant accidents that have, that

have had significant impact on communities. Some of the other speakers have spoken about removing the groundwaters by rail. I would like the EPA to consider constructing a groundwater facility on site for treating the water there, versus trucking it or removing it from the site at all.

Just to give you a little bit of an analogy, it would seem to be taking the proposed Bandaid approach. It's also like having a leaky roof and going up on the roof, and you patch the leak. Sooner or later, you're back up there patching another leak. The real problem is that the cap does not work, it's not adequate, it needs to be replaced.

I would like to ask the EPA to rethink. The monies are available. The real people that are responsible for this problem should be held liable; they're there now. Ten years from now

when this problem resurfaces, there's no one in this room can tell who's going to be there to pay for it. There's no one to say whether or not there'll be Superfund monies to address the problem. The problem's resurfaced. We have a serious health hazard. And I would like to ask the EPA to reconsider and address the problem adequately and address it once and for all. Thank you.

MS. LESHEN: And now I'd like to call David DeLorey, Jr.

MR. DELOREY: My name is David F. Delorey, Jr. I live at 1 Edgar Road, and I'm a selectman of the town.

I'd like to start off by identifying what the problem is, and then working toward the solution. The problem is two. The problem is that there is no documentation, and there is no oversight on the site. Those are the two problems. All these other issues that we're talking about are a function

of those two things. I think that all of the previous speakers, the EPA and everyone else, have been very polite in calling the Shaffer Landfill that, because it is not that.

The difference between a landfill and a dump is that a dump doesn't have any documentation. A dump does not have any oversight. This is a dump we're talking about, not a landfill. So with regard to that, I think that it is important to outline that what we really have here is a problem. What we have is a landfill that doesn't have a liner. Nobody would recommend a landfill without a liner, so it is a dump. In addition to the absence of a liner, excavations have been alleged fifteen feet below the current grade, which further exacerbates the problem of not having a liner.

In addition, the current landfill has been presumably capped, but it has

all kinds of problems: flat spots, depressions, fractures, outbreaks, and so on. And as a function of that, the current cap does not seem to be quite adequate to deal with the problem. The landfill slopes are not recommended slopes. There are -- the prescribed slopes are three to one; these are, these slopes are much more, much steeper.

A couple of things ought to be considered when dealing with these slopes, some corrective measures. One of them would be that denting would be put on the surface, that they would be terraced, or they would put retaining walls, or they would put traprock or they would encroach on the wetlands, or the solution would have to be to shave the slopes, or remove the material from the slope back to the top; or they would do all of these things. But something must be done toward the three to one

slopes.

Because the landfill doesn't have any manifest records, as I indicated at our last meeting, this leads to testimony that this is in fact a dump and not a landfill. And another idea that has surfaced, or another constraint has surfaced. In the last meeting when discussing the idea of other remedies, one was that the bedrock was fractured below the surface; and as a result of that, that even further exacerbates the problems, because any leachate will now get into the bedrock, will get into the aquifer. So that puts the town at further risk.

In addition, it's been alleged that the rail bed has subsurface piping that has not been plugged. Currently the site security is at a minimum, and there is a potential for the addition of unauthorized materials and all sorts of other problems.

So as a result of all of these constraints, I think that we have a special need to deal with the cap, because the cap, if not properly put in place, generates even more and more leachate and puts all of those issues that I just mentioned at risk.

What we have now, for a collection system, is -- Content Brook apparently serves as a role of disposing of some of the leachate. That has to be checked. There has to be something put in the way of between the dump and the brook.

Benchmark testings must be done in a tighter time frame and they must be preservedd, not thrown away. If -- what we need is the benchmark tests put in little bottles and we can watch them. Again, we don't know what's in that landfill, and our sophistication with checking chemicals is not geared to checking the things that we don't know all the problems right now. So we

should put those bottles away and look at them as the thirty-year maintenance cycle goes through.

We should put test wells, but not just one set of test wells. They should be -- I would call them shells, or onion skins, that round the, around the site. Perhaps -- and a minimum of two -- and to watch the leachate lateral migration, because the leachate lateral migration is going to be a problem in the future. We don't know what's going to happen to this dump because we don't know what is in this dump, and we don't know if the EPA's solution, if it doesn't involve a total, one hundred percent solution for a cap, what that will do five years, ten years, fifteen years, twenty years, and so on down the cycle.

We need to have some control plans and those control plans should be fully funded up front, not later. There should be some assurances.

The notion of a bond or an escrow account or some such thing like that must be put in place so that it can be paid for, because the third problem, beyond the documentation and the oversight, was the finances. It's already been brought out by a number of previous people. The finances are not there when we need them to react to the problem. As a result, the people in that area, the town of Billerica, the town of Tewksbury, are all put at risk for that third problem, which is finances.

The stack monitoring. There's a gentleman previously who spoke of it, Mr. Williams. The stack monitoring should be done before and after the -- I spoke with Mr. Williams and we had a very interesting discussion about this, and I would hope that the EPA would require before and after stack monitoring. We are not going -- we

should not incinerate chemicals like PCB's and PVB's at temperatures of four to six hundred degrees. You need eighteen hundred degrees for those particular chemicals. Others need different temperatures. We should find out what we're burning before we put it into the air.

The groundwater treatment must be offsite. It's far too costly to build a groundwater treatment plant onsite and defend it. And what I mean is that it would be subject to vandalism. All it will take is one vandalism attack to render our whole operation useless for long periods of time.

There is no way we are going to reclaim the spillages from an act of vandalism or a mechanical breakdown on site. We must have disaster recovery procedures and event management, and in no case should the documentation of this site ever not be a public record. The

problem with this landfill -- again, I said the two major problems were documentation and oversight. You cannot oversee that which you, that which is a secret. So all of the documentation should be a matter of public record sent to the board of selectmen, the board of health, and to the Billerica Public Library for those folks that are interested in finding out the progress of the maintenance the EPA will put forward.

I'm not going to get into an awful lot of other details about a couple of other issues, but I just wanted to leave the EPA with the notion that we should have adequate documentation. We should look to the future so that we can manage, successfully manage and react in a timely fashion, to events that we have no idea will happen at this time because we have no idea what is in that landfill.

And the last remark I'd like to make is that, because the town, this is the last time the townspeople and the town will have an opportunity to comment on the details of the EPA's plans and remedies, that I plan on filing, and I would assume that the board of selectmen ultimately will plan on filing, in addition to some of the remarks I made, other remarks plus some questions for the EPA to answer that there are no answers for at this time, as we learned at the last comment period.

I would like to thank the EPA for providing us this opportunity to provide comments. I'd also like to thank them for extending the comment period to allow the townspeople to react to your recommendations. In summary, I believe we should have a total cap, and we should have an adequate groundwater and leachate collection system. And I'm not an engineer so I don't know what that

is. Other folks can speak to that. Thank you.

MS. LESHEN: I'd like to call Arthur Doyle.

MR. DOYLE: Most of it's been said. I don't like to reiterate, but as a town selectman and a committee member, I want to stress the fear that the money will not be there to complete this job. We hoped that you would have the money up front so that when you're fifty percent or seventy-five percent along with the job, you won't walk away from the job. If the money is in an escrow account, we know it's guaranteed. We know the money is there, and the job will be completed. This is a fear of most of us in the town.

Also, too, an ongoing project report should be sent to the board of selectmen, the board of health, and even a coopy to the library, so that we could, anybody could get their hands on

it, and read it, so there won't be any surprises, and the work being done on this project, and we'll know what's going on on an ongoing -- and there won't be anything confidential in this, because there shouldn't be anything confidential. I want to see everything kept above board, so that we all know what's going on during the cleanup.

I want to thank the EPA for giving us this opportunity to stress our feelings on this. Thank you.

MS. LESHEN: If anyone would like to make additional comments, you can just put up your hand, and we have additional cards, but we also have two people that would like to make a comment. I'll call Christine Chisholm. Christine Chisholm.

MS. CHISHOLM: I've been living in Billerica all my life, and I'm an environmental scientist. I was asked to look over some of the documents. I

haven't been with the Superfund Action Committee as long as some other people have, but I was able to make some technical advisory comments to the Superfund Action Committee.

A comment was made at the last meeting, 2/5/91, that the caps are atypical, liners are the norm, and caps are a fix. While in the mid-'60s, the Department of Natural Resources gave a permit to the Shaffer's on the condition that a liner be put in, a liner was never installed into the landfill, and the landfill was actually excavated fifteen feet below the groundwater table. Therefore we want the best fix for this landfill, a total reconstruction of the cap, as other people have mentioned.

The EPA's remedy assumes that over time, contamination levels in the groundwater will decrease. Given the current contamination levels adjacent to

the landfill and the absence of groundwater treatment, I feel that detailed and rigorous groundwater monitoring program is necessary to ensure that the cap is achieving its design criteria. It is imperative that this monitoring program include contingencies for groundwater treatment should contamination levels increase above the maximum contamination levels, or the MCL's.

I suggest that the monitoring program include a series of monitoring wells adjacent to the landfill and a series adjacent to the property lines. Prior to this, a round of current groundwater and surface water samples should be taken in order to adequately assess current contamination levels. The last round of samples was taken in 1988, two years ago. With groundwater movement occurring, according to the EPA, at 50 to 500 feet per year, a

two-year monitoring gap or sampling gap seems to be a rather inadequate assessment of current levels, and therefore an inadequate basis for current or design criteria.

I agree with EPA regarding the on-site collection of leachate and the off-site treatment of this leachate. I also agree with the perimeter fence and I'm rather surprised that we are now just getting this fence. I also want to reiterate the point that JoAnne made, to initiate a natural resource damage assessment as provided by CERCLA. Thank you.

MS. LESHEN: I'd like to call Robert Donati.

MR. DONATI: Hi. I live on 302 Andover Road. I'm also an environmental engineer who has worked on the Superfund sites for several years, so I'm familiar with the activities that take place.

The entire effectiveness of the

remedial design that EPA chose is contingent upon the integrity of the cap; That is, that the cap would completely isolate the waste, reducing the migration of leachate into the groundwater and resulting in an overall reduction of groundwater contamination levels. The remedy also assumes that the existing cap was properly installed to begin with. That is, proper compaction and moisture content requirements were attained. And given the past history of the landfill activities, I think this is a very generous, if not unfounded, assumption. In the documents I read there's no information to indicate that the landfill cap was installed properly to begin with.

Throughout the remedial investigation report, there were concerns raised regarding the integrity of the existing cap. These concerns

included inadequate and inconsistent thicknesses of the impermeable clay layer, topsoil layer in many areas not thick enough to support vegetation to prevent erosion, lack of a sufficient drainage layer, or any drainage layer for that matter, and I think most importantly, concerns that the cover may not adequately protect against frost damage to the clay layer. There's test pits and permeability testing information results that have been conducted that support that conclusion.

I think while the EPA option addresses some of these problems, I don't think it addresses the two most important ones, that is, whether the existing cap was properly installed and in the absence of any drainage layer, with the option that's selected, that this would prevent frost damage to the clay layer.

Given all the concerns raised and

the RI and other reports, it would appear obvious to me and apparently to everybody else that's been up here tonight that without groundwater treatment, the only remedy of choice would be a total reconstruction of the cap, a cap that includes a liner, a drainage layer, a filter layer, and a vegetative cover. This also meets EPA's recommendations for the design. A cover design that just satisfies the '84 consent decree does not appear to be adequate.

In addition, along with the reconstruction, I think it's necessary that we institute strong institutional controls to prevent human exposure to the soils and groundwater, to prevent any groundwater on that site from being used for drinking in the future. Thank you.

MS. LESHEN: At this point I would like to ask, is there anyone else that

would like to make a comment into the record? You can go again. Is there anyone else? Is there anyone else that would like to make a comment into the record?

MR. DELOREY: David Delorey. There's one thing that is very striking in the EPA's matrix, the recommended matrix, and that is that one of them is to do nothing, which is one absurd solution to the problem. But the other absurd solution to the problem that is not priced out, so that we can find out what the real limits are, is to do right by what all the regulations are in place right now; that is to put a liner under the landfill. No one priced that part out.

Now, I admit it's an exercise, but so isn't doing nothing. But it does frame the problem. And, you know, to really solve the problem, I think, is to dispose of all the materials in the

proper fashion and convert the dump into a landfill. So I would appreciate the EPA just taking a look at that, just to frame the price, to make sure that when this goes, it will end up in court in terms of assessing the costs, that the courts are apprised of how reasonable the solution put forth tonight is, in terms of the current -- of the recommendation's implementation, which I, which I would say would be in the tens of millions, if not in the hundreds of millions of dollars to do that solution. And I think that that serves the responsible parties well. Thank you.

MS. LESHEN: Is there anyone else that would like to read a comment into the record this evening?

Hearing no further requests, I will close the hearing this evening. People are welcome to submit written comments to our office by March 16. They should

be addressed to Don McElroy, and his address is on the back of the proposed plan. The comments received this evening, February 5, as well as any comments received in writing prior to March 16 will be responded to in writing in a document called a Responsiveness Summary, which will be attached to a decision document called a Record of Decision.

The proposed plans, if anyone needs one, are at the desk coming in, as well as there is additional information in terms of the remedial investigation and feasibility study, which are available in the Billerica Public Library, as well as our offices in Boston.

Hearing no further comments, I will close the hearing this evening.

(Hearing closed)

ENVIRONMENTAL PROTECTION AGENCY

I, ELIZABETH M. BROOKS, Registered Professional Reporter, do hereby certify that the foregoing testimony is true and accurate, to the best of my knowledge and ability.

WITNESS MY HAND, this 22nd day of February, 1991.

Elizabeth M. Brooks

EMB/ed

APPENDIX F

Iron Horse Park
(Operable Unit II - Shaffer Landfill)

NPL Site Administrative Record

Index

Compiled: January 15, 1991
ROD Signed: June 27, 1991

Prepared for

Region I
Waste Management Division
U.S. Environmental Protection Agency

With Assistance from

AMERICAN MANAGEMENT SYSTEMS, INC.
One Bowdoin Square, 7th Floor • Boston, Massachusetts 02114 • (617) 557-2000

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Iron Horse Park
(Operable Unit II - Shaffer Landfill)
NPL Site Administrative Record

(ROD Signed: June 27, 1991)

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(Operable Unit II - Shaffer Landfill)
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Introduction

This document is the Index to the Administrative Record for the June 27, 1991 Record of Decision (ROD) for the Iron Horse Park National Priorities List (NPL) site (Operable Unit II - Shaffer Landfill). Section I of the Index cites site-specific documents, and Section II cites guidance documents used by EPA staff in selecting a response action at the site.

The Administrative Record is available for public review at EPA Region I's Office in Boston, Massachusetts, and at the Billerica Public Library, 25 Concord Road, Billerica, Massachusetts, 01821. *This Administrative Record includes, by reference only, all documents included in the September 14, 1988 Administrative Record for this NPL site.* Questions concerning the Administrative Record should be addressed to the EPA Region I site manager.

The Administrative Record is required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

Section I

Site-Specific Documents

ADMINISTRATIVE RECORD INDEX

for the

Iron Horse Park NPL Site

(Operable Unit II - Shaffer Landfill)

ROD Signed: June 27, 1991

1.0 Pre-Remedial

1.18 FIT Technical Direction Documents (TDDs) and Associated Records

1. Memorandum from Rebecca Cleaver, NUS Corporation to Richard Leighton, EPA Region I (March 6, 1984). Concerning drinking water samples tested for metals.
2. Memorandum from Rebecca Cleaver, NUS Corporation to Richard Leighton, EPA Region I (April 24, 1984). Concerning the transmittal of analytical results for all samples collected during the NUS/FIT Site Inspection.

3.0 Remedial Investigation (RI)

3.1 Correspondence

1. Memorandum from Bruce Marshall, EPA Region I to Addressees (April 17, 1987). Concerning transmittal of the Wetland/Floodplain and Biota Assessment sections of the Remedial Investigation/Feasibility Study work plan and the request for written comments by May 6, 1987.
2. Memorandum from Bruce Marshall, EPA Region I to Addressees (May 13, 1987). Concerning transmittal of the Remedial Investigation Phase IA Report and the request for written comments by June 1, 1987.
3. Letter from Ralph P. Penney, GHR Engineering Associates, Inc. to John Gallagher, EPA Region I (March 15, 1989). Concerning transmittal of the attached information pertaining to capping activities at the landfill.
4. Letter from John Gallagher, EPA Region I to Richard Bento, Town of Billerica Department of Public Works (December 6, 1989). Concerning transmittal of the November 1989 "Phase IC Remedial Investigation Report - Volume I," Camp Dresser & McKee Inc. for comments.
5. Letter from John Gallagher, EPA Region I to Dale Young, Commonwealth of Massachusetts Department of Environmental Protection (December 6, 1989). Concerning transmittal of the November 1989 "Phase IC Remedial Investigation Report - Volume I," Camp Dresser & McKee Inc. for comments.
6. Letter from John Gallagher, EPA Region I to Raymond G. Dougan, Commonwealth of Massachusetts Department of the Attorney General (January 3, 1990). Concerning transmittal of the November 1989 "Phase IC Remedial Investigation Report - Volume I," Camp Dresser & McKee Inc. and the Shaffer Landfill Draft Feasibility Study for comments.

3.2 Sampling and Analysis Data

Additional Sampling and Analysis and Contract Laboratory Program (CLP) Data as well as the Chain of Custody Records for the Remedial Investigation (RI) for both Operable Units may be reviewed, by appointment only, at EPA Region I, Boston, Massachusetts.

3.2 Sampling and Analysis Data (cont'd.)

1. Letter from Stephen V. Capone, Alliance Technologies Corporation to Edward Braczyk, Commonwealth of Massachusetts Department of Environmental Quality Engineering (November 7, 1988). Concerning transmittal of the attached "Summary Report - Gas Flare Testing - Passive Mode."
2. Memorandum from Scott Clifford and Mary Jane Cuzzupe, EPA Region I to John Carlson, EPA Region I (September 11, 1989). Concerning drinking water purgeable organic analysis.
3. "Residential Property Sampling Survey," Roy F. Weston, Inc. (September 19, 1989).
4. Memorandum from Michael Whitehead, Camp Dresser & McKee Inc. to Dick Christian, Camp Dresser & McKee Inc. (November 1, 1989). Concerning the results of the permeability and density tests performed to evaluate the caps at the site.
5. Memorandum from Thomas McGrath, Commonwealth of Massachusetts Department of Environmental Protection to Helen Waldorf, Commonwealth of Massachusetts Department of Environmental Protection (June 4, 1990). Concerning the results of air monitoring conducted during the May 23, 1990 site walkover.
6. Memorandum from Thomas McGrath, Commonwealth of Massachusetts Department of Environmental Protection to Dale Young, Commonwealth of Massachusetts Department of Environmental Protection (July 31, 1990). Concerning the results of the detailed landfill gas emission survey conducted on July 2, 1990 and July 16, 1990.

3.4 Interim Deliverables

1. "Wetlands Characterization and Biological Investigations," CDM Federal Programs Corporation (January 1989).

3.5 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Letter from Rich Cavagnero, EPA Region I to Madeline Snow, Commonwealth of Massachusetts Department of Environmental Quality Engineering (March 12, 1987). Concerning the request to identify the Applicable or Relevant and Appropriate Requirements (ARARs) for the B & M Lagoon and the Shaffer Landfill.
2. Letter from John Gallagher, EPA Region I to Robert Bois, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 14, 1989). Concerning the request to identify the Applicable or Relevant and Appropriate Requirements (ARARs) for the Shaffer Landfill.

3.6 Remedial Investigation (RI) Reports

1. "Phase IC Remedial Investigation Report - Volume I," Camp Dresser & McKee Inc. (November 1989).
2. "Phase IC Remedial Investigation Report - Volume II - Appendices," Camp Dresser & McKee Inc. (November 1989).

3.7 Work Plans and Progress Reports

1. Letter from Sharon A. Checrallah, JoAnne Giovino, Dorothy P. Walker, and Helen R. Knight, Superfund Action Committee to Richard Leighton, EPA Region I (March 23, 1985). Concerning comments on the December 21, 1984 "Draft Work Plan for Remedial Investigation/Feasibility Study - Volume I: Technical Scope of Work," Camp Dresser & McKee Inc.
2. "Work Plan Excerpts for Shaffer Landfill (RI only)."

4.0 Feasibility Study (FS)

4.1 Correspondence

1. Letter from John Gallagher, EPA Region I to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Protection (December 15, 1989). Concerning transmittal of the first draft of the Feasibility Study.
2. Letter from John Gallagher, EPA Region I to Ken Carr, U.S. Fish & Wildlife Service (December 15, 1989). Concerning transmittal of the first draft of the Feasibility Study.
3. Letter from John Gallagher, EPA Region I to Dale Young, Commonwealth of Massachusetts Department of Environmental Protection (December 15, 1989). Concerning transmittal of the first draft of the Feasibility Study.
4. Letter from Don McElroy, EPA Region I to Allen Johnson, Massachusetts Historical Commission (March 6, 1991). Concerning the remedial alternatives being contemplated by EPA and their effect on the Middlesex Canal.
5. Letter from Elsa Fitzgerald for Judith B. McDonough, Massachusetts Historical Commission to Don McElroy, EPA Region I (March 22, 1991) with two attached letters. Concerning the remedial work scheduled for the site and how it relates to the Middlesex Canal.

4.5 Applicable or Relevant and Appropriate Requirements (ARARs)

1. Letter from M. Gretchen Muench, EPA Region I to Donald Nagle, Commonwealth of Massachusetts Department of Environmental Protection (April 12, 1991). Concerning notification that EPA Region I does not believe that the Massachusetts Contingency Plan and Chapter 21E are Applicable or Relevant and Appropriate Requirements (ARARs) and the attached:
   A. Letter from William Walsh-Rogalski, EPA Region I to Peter R. Bronson, Commonwealth of Massachusetts Department of Environmental Protection (January 3, 1991).
   B. Letter from William Walsh-Rogalski, EPA Region I to Peter R. Bronson, Commonwealth of Massachusetts Department of Environmental Protection (January 9, 1991).
2. Letter from Peter R. Bronson, Commonwealth of Massachusetts Department of Environmental Protection to William Walsh-Rogalski, EPA Region I (April 22, 1991). Concerning the Commonwealth of Massachusetts Department of Environmental Protection's position on whether the Massachusetts Contingency Plan is an Applicable or Relevant and Appropriate Requirement (ARAR).
3. Memorandum from M. Gretchen Muench, EPA Region I to File (June 27, 1991). Concerning notification that EPA Region I does not consider 310 CMR 19.150, 151, 021 to be Applicable or Relevant and Appropriate Requirements (ARARs) and that the state will concur with the selected remedy.

4.6 Feasibility Study (FS) Reports

Report

1. "Final Draft Phase IC Feasibility Study Report," Camp Dresser & McKee Inc. (January 1991).

4.6 Feasibility Study (FS) Reports (cont'd.)

Comments

2. Cross-Reference: Comments Dated February 22, 1991 from Thomas G. Carbone, Town of Tewksbury on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc. and the January 1991 Proposed Plan [Filed and cited as entry number 2 in 5.3 Responsiveness Summaries].
3. Cross-Reference: Comments Dated March 6, 1991 from Arnold Ventresca, Wallace Mallett, Paul Ransom, Marie O'Rourke, Robert Soloman, John W. Morris on the January 1991 Proposed Plan [Filed and cited as entry number 16 in 5.3 Responsiveness Summaries].
4. Cross-Reference: Comments Dated March 14, 1991 from David F. Delorey Jr., Town of Billerica on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc. and the January 1991 Proposed Plan [Filed and cited as entry number 28 in 5.3 Responsiveness Summaries].
5. Cross-Reference: Comments Dated March 15, 1991 from Town of Billerica Conservation Commission on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc. and the January 1991 Proposed Plan [Filed and cited as entry number 35 in 5.3 Responsiveness Summaries].

4.9 Proposed Plan for Selected Remedial Action

1. "EPA Proposes Cleanup Plan for the Shaffer Landfill Portion of the Iron Horse Park Superfund Site," EPA Region I (January 1991).
2. "EPA Issues Supplement to Proposed Plan for Cleanup of the Shaffer Landfill Landfill, Iron Horse Park Superfund Site," EPA Region I (May 1991).

5.0 Record of Decision (ROD)

5.1 Correspondence

1. Memorandum from Don McElroy, EPA Region I to File (June 26, 1991). Concerning notification that EPA Region I coordinated with the Commonwealth of Massachusetts Department of Environmental Protection and solicited and received comments on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc., the January 1991 Proposed Plan, the May 1991 Supplemental Proposed Plan, and the Record of Decision (ROD).
2. Cross-Reference: Memorandum from M. Gretchen Muench, EPA Region I to File (June 27, 1991). Concerning notification that EPA Region I does not consider 310 CMR 19.150, 151, 021 to be Applicable or Relevant and Appropriate Requirements (ARARs) and that the state will concur with the selected remedy [Filed and cited as entry number 3 in 4.5 Applicable or Relevant and Appropriate Requirements (ARARs)].
3. "Total Estimated Costs for Shaffer Remedy," EPA Region I.

5.3 Responsiveness Summaries

1. Cross-Reference: Responsiveness Summary is an attachment to the June 27, 1991 "Record of Decision," EPA Region I [Filed and cited as entry number 1 in 5.4 Record of Decision (ROD)].

5.3 Responsiveness Summaries (cont'd.)

The following citations indicate documents received by EPA Region I during the first formal public comment period.

2. Comments Dated February 22, 1991 from Thomas G. Carbone, Town of Tewksbury on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc. and the January 1991 Proposed Plan.
3. Comments Dated February 25, 1991 from Jerry L. Tuzzolo and Stephanie M. Tuzzolo on the January 1991 Proposed Plan.
4. 1 Comment Letter Dated February 27, 1991 from Member of the Public on the January 1991 Proposed Plan.
5. 4 Comment Letters Dated February 28, 1991 from Members of the Public on the January 1991 Proposed Plan.
6. 21 Comment Letters Dated March 1, 1991 from Members of the Public on the January 1991 Proposed Plan.
7. Comments Dated March 1, 1991 from Patricia McGovern, Commonwealth of Massachusetts Committee on Ways and Means on the January 1991 Proposed Plan.
8. Comments Dated March 1, 1991 from Brion M. Cangiamila, Member of the Commonwealth of Massachusetts House of Representatives on the Proposed Plan.
9. 3 Comment Letters Dated March 2, 1991 from Members of the Public on the January 1991 Proposed Plan.
10. 2 Comment Letters Dated March 3, 1991 from Members of the Public on the January 1991 Proposed Plan.
11. 9 Comment Letters Dated March 4, 1991 from Members of the Public on the January 1991 Proposed Plan.
12. 12 Comment Letters Dated March 5, 1991 from Members of the Public on the January 1991 Proposed Plan.
13. Comments Dated March 5, 1991 from Levon Chorbajian on the January 1991 Proposed Plan.
14. 18 Comment Letters Dated March 6, 1991 from Members of the Public on the January 1991 Proposed Plan.
15. Comments Dated March 6, 1991 from John J. Moynihan on the January 1991 Proposed Plan.
16. Comments Dated March 6, 1991 from Arnold Ventresca, Wallace Mallett, Paul Ransom, Marie O'Rourke, Robert Soloman, John W. Morris, Town of Billerica on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc. and the January 1991 Proposed Plan.
17. 10 Comment Letters Dated March 7, 1991 from Members of the Public on the January 1991 Proposed Plan.
18. Comments Dated March 7, 1991 from William H. Hulbrunner on the January 1991 Proposed Plan.
19. 9 Comment Letters Dated March 8, 1991 from Members of the Public on the January 1991 Proposed Plan.
20. Comments Dated March 9, 1991 from Madeline T. Sargent, Town of Billerica on the January 1991 Proposed Plan.
21. 1 Comment Letter Dated March 9, 1991 from Member of the Public on the January 1991 Proposed Plan.
22. 5 Comment Letters Dated March 10, 1991 from Members of the Public on the January 1991 Proposed Plan.
23. 6 Comment Letters Dated March 11, 1991 from Members of the Public on the January 1991 Proposed Plan.
24. Comments Dated March 12, 1991 from Helen R. Knight on the January 1991 Proposed Plan.
25. Comments Dated March 12, 1991 from Carl T. Moore on the January 1991 Proposed Plan.

5.3 Responsiveness Summaries (cont'd.)

26. 1 Comment Letter Dated March 13, 1991 from Member of the Public on the January 1991 Proposed Plan.
27. 3 Comment Letters Dated March 14, 1991 from Members of the Public on the January 1991 Proposed Plan.
28. Comments Dated March 14, 1991 from David F. Delorey Jr., Town of Billerica on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc. and the January 1991 Proposed Plan. and the following attachments:
    A. Letter from Robert S. Knorr, and Jonathan Spack, Massachusetts Health Research Institute, Inc. to Henry S. Cassell III, Center for Disease Control (April 17, 1990).
    B. Letter from Henry S. Cassell III, Agency for Toxic Substances and Disease Registry to Jonathan Spack, Massachusetts Health Research Institute, Inc. (June 22, 1990).
29. Comments Dated March 14, 1991 from Ann dePierro, Massachusetts Bay Transportation Authority on the January 1991 Proposed Plan.
30. Comments Dated March 14, 1991 from Charlotte Cooper on the January 1991 Proposed Plan.
31. 1 Comment Letter Dated March 15, 1991 from Member of the Public on the January 1991 Proposed Plan.
32. Comments Dated March 15, 1991 from Edward J. Markey, Member of the United States Congress on the January 1991 Proposed Plan.
33. Comments Dated March 15, 1991 from Steven C. Sneider and Leonard C. Sarapas, Balsam Environmental Consultants, Inc. for Graypond Realty Corporation on the January 1991 Proposed Plan.
34. Comments Dated March 15, 1991 from Thomas A. Mackie, Wright & Moehrke (Attorney for Graypond Realty Corporation) on the January 1991 Proposed Plan.
35. Comments Dated March 15, 1991 from Town of Billerica Conservation Commission on the January 1991 "Final Draft Phase IC Feasibility Study," Camp Dresser & McKee Inc. and the January 1991 Proposed Plan.
36. Comments Dated March 15, 1991 from Suzanne K. Condon and William C. Strohsnitter, Commonwealth of Massachusetts Department of Public Health on the January 1991 Proposed Plan.
37. Comments Dated March 15, 1991 from Dale C. Young and Helen Waldorf, Commonwealth of Massachusetts Department of Environmental Protection on the January 1991 Proposed Plan.
38. Comments Dated March 16, 1991 from Rick Shaffer on the January 1991 Proposed Plan.
39. Comments Dated March 16, 1991 from Alfred E. Wilson, Gone Birding! on the January 1991 Proposed Plan.

The following citations indicate documents received by EPA Region I after the first formal public comment period.

40. 2 Comment Letters Dated March 18, 1991 from Members of the Public on the January 1991 Proposed Plan.
41. 1 Comment Letter Dated March 19, 1991 from Member of the Public on the January 1991 Proposed Plan.
42. 1 Comment Letter Dated March 21, 1991 from Member of the Public on the January 1991 Proposed Plan.
43. 2 Comment Letters Dated March 22, 1991 from Members of the Public on the January 1991 Proposed Plan.
44. 1 Comment Letter Dated March 24, 1991 from Member of the Public on the January 1991 Proposed Plan.

5.3 Responsiveness Summaries (cont'd.)

45. 1 Comment Letter Dated March 26, 1991 from Member of the Public on the January 1991 Proposed Plan.
46. 1 Comment Letter Dated March 28, 1991 from Member of the Public on the January 1991 Proposed Plan.
47. Comments from David L. Johnson on the January 1991 Proposed Plan.
48. 1 Comment Letter from Member of the Public on the January 1991 Proposed Plan.

The following citations indicate documents received by EPA Region I during the second public comment period.

49. Comments Dated June 12, 1991 from Helen R. Knight on the May 1991 Supplement to the Proposed Plan.
50. Comments Dated June 14, 1991 from Ann dePierro, Massachusetts Bay Transportation Authority on the May 1991 Supplement to the Proposed Plan with the attached Comments Dated March 14, 1991 from Ann dePierro, Massachusetts Bay Transportation Authority on the January 1991 Proposed Plan.

5.4 Record of Decision (ROD)

1. "Record of Decision," EPA Region I (June 27, 1991).

10.0 Enforcement

10.3 State and Local Enforcement Records

1. Memorandum from Mr. Karaian to Mr. McLoughlin (February 21, 1968). Concerning transmittal of the attached February 19, 1968 "Proposal to the Town of Billerica from Graypond Realty Trust" and February 19, 1968 Letter from The Dump Study Committee to the Town of Billerica Board of Health.
2. Letter from the Deputy Commissioner to the Town of Billerica Board of Health (July 11, 1968). Concerning the October 11, 1967 hearing regarding the operation of the commercial dump owned by the Graypond Realty Corp.
3. Memorandum from Kenneth A. Tarbell to File (July 23, 1968). Concerning a complaint that had been filed regarding the burning of waste at the commercial dump owned by the Graypond Realty Corp.
4. Letter from John C. Collins, Division of Sanitary Engineering to the Town of Billerica Board of Health (July 23, 1968). Concerning the continued burning of refuse at the site despite ordinances banning the process.
5. Memorandum from Richard R. Albanese to File (September 23, 1968). Concerning an investigation of the site in response to a complaint of burning refuse.
6. Letter from Russell A. Young (Attorney for Graypond Realty Trust) to David L. Standley, Commonwealth of Massachusetts Department of Environmental Engineering (December 2, 1975). Concerning confirmation that the volume of solid waste at the site does not exceed one hundred seventy-five tons per day.
7. "Solid Waste Disposal Inspection Sheet" (August 10, 1977).
8. "Solid Waste Disposal Inspection Sheet" (January 11, 1978).
9. Letter from Kenneth A. Tarbell, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Graypond Realty Trust (February 23, 1978). Concerning the January 12, 1978 inspection and the discovery that violations of the "Regulations for the Disposal of Solid Wastes by Sanitary Landfill" still exist.

10.3 State and Local Enforcement Records (cont'd.)

10. Letter from Thomas McLoughlin to Burton Shaffer, Graypond Realty Trust (April 7, 1978). Concerning the order to cease operations at the landfill until various violations have been corrected.
11. "Solid Waste Disposal Inspection Sheet" (July 7, 1978).
12. Letter from Russell A. Young, Russell A. Young (Attorney for Graypond Realty Trust) to Kenneth A. Tarbell, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 5, 1979). Concerning the progress of the corrections of violations at the site.
13. "Solid Waste Disposal Inspection Sheet" (August 22, 1980).
14. "Solid Waste Disposal Inspection Sheet" (October 23, 1980).
15. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Graypond Realty Trust (December 18, 1980). Concerning the results of the "Open Dump Inventory" completed in the Spring of 1980.
16. Letter from Burton Shaffer, Middlesex Disposal Service, Inc. to William St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 22, 1981). Concerning the composition of the material dredged up from the bottom of Nuttings Lake.
17. "Solid Waste Disposal Inspection Sheet" (May 28, 1981).
18. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Graypond Realty Trust (June 22, 1981). Concerning the May 28, 1981 inspection of the facility and the overall evaluation of the operation and condition of the facility as poor.
19. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Graypond Realty Trust (July 21, 1982). Concerning a second notice to correct violations at the site and specific remedial actions that are required.
20. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Graypond Realty Trust (December 10, 1982). Concerning the status of the site and further measures that must be taken to correct deficiencies.
21. "DEQE Oil and Hazardous Material Spill/Release Incident Initial Inspection Report," Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 1, 1984).
22. Letter from John C. Gherson, Town of Billerica Department of Health to Burton Shaffer, Middlesex Disposal Service, Inc. (February 3, 1984). Concerning confirmation that Middlesex Disposal Service, Inc. will take immediate action to correct violations at the site.
23. Trip Report on a Visit to the Iron Horse Park Site, John Maddox, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 7, 1984). Concerning the September 21, 1983 inspection of the site.
24. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Middlesex Disposal Service, Inc. (May 18, 1984). Concerning notice that the Commonwealth of Massachusetts Department of the Attorney General has extended the operation of the landfill to June 6, 1984 in order to allow for the execution of the Consent Judgment.
25. Memorandum from John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering to William Cass, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 13, 1985). Concerning notification that disposal operations at the Shaffer Landfill will cease or be substantially reduced by September or October of 1985.

10.3 State and Local Enforcement Records (cont'd.)

26. "Certificate of the Secretary of Environmental Affairs on the Supplemental Final Environmental Impact Report," Commonwealth of Massachusetts Executive Office of Environmental Affairs (September 16, 1985).
27. Letter from William F.M. Hicks, Cuddy, Lynch, Manzi & Cunningham (Attorney for Citizens Group of Billerica) to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 18, 1986). Concerning transmittal of the attached
    A. Agreement for Judgment, *The Department of Environmental Quality Engineering, The Attorney General of the Commonwealth of Massachusetts and Anthony P. Bonacci, Julie A. Bonacci, Beverly Chorbajian, Leon Chorbajian, Joseph J. Grant, Helen R, Knight, Martin L. Mills, Carl L. Moore, Eleanor K. Moore, Diane Robinson and Michael Tomberlin v. Irving Shaffer, Individually and as Trustee of the Graypond Realty Trust, Philip W. Shaffer, Individually and as the Former Trustee of the Graypond Realty Trust, Middlesex Disposal Service, Inc., Suffolk Services, Inc., Shaffer Enterprises, Inc., Shaffer Realty Corp., Burton Shaffer, Milton Shaffer, Frederick S. Shaffer, Ruth Shaffer, and Thomas S. Bagley, as Trustee of the Frederick Shaffer Realty Trust,* Commonwealth of Massachusetts Superior Court, Civil Action No. 83-6986 (February 19, 1986).
    B. Final Judgment, *The Department of Environmental Quality Engineering, et al. v. Irving Shaffer, et al.*, Commonwealth of Massachusetts Superior Court, Civil Action No. 83-6986 (June 12, 1984).
28. "DEQE Oil and Hazardous Material Spill/Release Incident Inspection Report" Form, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 2, 1986).
29. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Suffolk services, Inc. (January 20, 1987). Concerning odor generation at the site.
30. Letter from Edward A. Kunce for Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Graypond Realty Trust (June 12, 1987). Concerning the Gas Extraction and Gas Treatment and Discharge phases of the odor abatement project for the landfill.
31. Letter from Edward A. Kunce, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Richard R. DeBenedictis, GHR Engineering, Burton Shaffer, Middlesex Disposal Services, Inc., Anton T. Moehrke, Wright & Moehrke (Attorney for Graypond Realty Trust), Town of Billerica Conservation Commission (July 13, 1987). Concerning transmittal of the attached "Amended Superseding Order of Conditions Massachusetts Wetlands Protection Act," Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 13, 1987).
32. Letter from Edward A. Kunce, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Valerie A. Talmadge, Commonwealth of Massachusetts Historical Commission (July 13, 1987). Concerning transmittal of the attached "Notice of Effect to Historic Properties."
33. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Middlesex Disposal Services, Inc. (August 26, 1987). Concerning the presence of several leachate seeps at both the residential and commercial areas of the landfill.
34. Letter from Anton T. Moehrke, Wright & Moehrke (Attorney for Graypond Realty Trust) to Raymond G. Dougan, Commonwealth of Massachusetts Department of the Attorney General (September 1, 1987). Concerning the gas venting schedule for the landfill.

10.3 State and Local Enforcement Records (cont'd.)

35. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to Jane Nolan, Town of Billerica Board of Appeals (September 2, 1987). Concerning the request for a meeting with the Board of Appeals and the attached "Statement of Clarification for Special Permit Granted to Graypond Realty Corp. on August 17, 1987."
36. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 28, 1987). Concerning notification that pipes for the gas venting system was completed September 28, 1987 and that initial sampling for the gas venting system should be completed by October 1, 1987.
37. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (March 1, 1988). Concerning the list of people to be contacted regarding activities at the Shaffer Landfill.
38. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 15, 1988). Concerning a visit to the site of June 8, 1988 and clarification of closure activities.
39. "Notice of Intent to Assess A Civil Administrative Penalty," Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 5, 1988).
40. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Irving Shaffer, Graypond Realty Trust (December 3, 1988). Concerning issues raised in the October 25, 1988 "Inclusive Monthly Activities Report from July 1988 for the Pond Street Landfill," GHR Engineering Associates, Inc.
41. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 28, 1988). Concerning the response to the December 3, 1988 letter regarding closure activities.
42. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Paul Talbot, Town of Billerica (January 5, 1989). Concerning the request that the Town of Billerica consider use of the expanded treatment facility in a leachate management plan for the landfill.
43. Letter from Peter J. Gray, Town of Billerica Board of Health to Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 20, 1989). Concerning recommendations on the proposed sewer tie-in at Pond Street.
44. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 26, 1989). Concerning revisions to the Post Closure Operation and Maintenance Plan.
45. Letter from John W. Duggan and Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Irving Shaffer, Graypond Realty Trust (August 15, 1989). Concerning the status of groundwater and leachate containment, collection and treatment, odor abatement, and operation and maintenance of the landfill cap.
46. Letter from James C. Coleman, Commonwealth of Massachusetts Executive Office of Environmental Affairs to Thomas A. Mackie, Wright & Moehrke (Attorney for Middlesex Disposal Services) (June 8, 1990). Concerning notification that Middlesex Disposal Services is potentially responsible for the construction of a fence around the Shaffer Landfill.

10.3 State and Local Enforcement Records (cont'd.)

47. Letter from James C. Coleman, Commonwealth of Massachusetts Executive Office of Environmental Affairs to Irving Shaffer, Richard Shaffer, Milton Shaffer, Mark Shaffer, and Burton Shaffer, Graypond Realty Corporation (July 16, 1990). Concerning conditional acceptance of the July 3, 1990 proposal to fence the Shaffer Landfill portion of the site.
48. Letter from Dale Young, Commonwealth of Massachusetts Department of Environmental Protection to Graypond Realty Corporation (March 19, 1991). Concerning the fence to be built around three sides of the site.

11.0 Potentially Responsible Party (PRP)

11.9 PRP-Specific Correspondence

Town of Arlington

1. Letter from Donald R. Marquis, Town of Arlington Office of the Town Manager to Town of Billerica Board of Selectmen (May 26, 1970). Concerning notification that an agreement is pending between the Town of Arlington and Philip Shaffer for refuse disposal.

Boston & Maine Corporation

2. Letter from Jim Diorio, Boston & Maine Corporation to Gino L. Palmacci, Massachusetts Bay Transportation Authority (January 31, 1986). Concerning encroachment of the landfill onto property owned by Boston & Maine Corporation.

Graypond Realty Trust

3. Letter from Richard DeBenedictis, GHR Engineering Corporation to Anton T. Moehrke, Wright & Moehrke (Attorney for Graypond Realty Trust) (December 7, 1984). Concerning a response to the October 31, 1984 "Certificate of the Secretary of Environmental Affairs on Pond Street Sanitary Landfill."
4. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to Raymond G. Dougan, Commonwealth of Massachusetts Department of the Attorney General (March 8, 1989). Concerning notification that Graypond Realty Trust has contracted with GHR Engineering Associates, Inc. to comply with the requirements of the December 3, 1988 Letter from Commonwealth of Massachusetts Department of Environmental Quality Engineering.

11.12 PRP-Related Documents

1. "Report and Operating Procedure," Graypond Realty Trust (October 1975).

13.0 Community Relations

13.1 Correspondence

1. Letter from Brian J. Sullivan (Attorney for Carl Moore) to the Commonwealth of Massachusetts Executive Office of Environmental Affairs (April 6, 1982). Concerning the desire that the Shaffer Landfill be closed immediately.
2. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Ferren Residence (September 21, 1982). Concerning the results of water sampling and the attached "Gas Chromatography-Mass Spectromentry Analysis of Purgeable Organics," Commonwealth of Massachusetts Department of Environmental Quality Engineering.
3. Letter from Helen R. Knight, Committee to Enforce Dump Controls to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 11, 1982). Concerning the existing situation at the landfill and the attached "Map Showing Points At Which Leachate Is Visibly Entering The Wetland."
4. Letter from Ralph M. Krau, Town of Billerica Finance Committee to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 10, 1985). Concerning the financial repercussions of closing the Shaffer Landfill.
5. Letter from David L. Johnson to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 21,1985). Concerning the request for copies of all final plans regarding the Shaffer Landfill.
6. Letter from David L. Johnson to Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 18, 1985). Concerning the demand for action to be taken by the Commonwealth of Massachusetts Department of Environmental Quality Engineering in cleaning up the Shaffer Landfill.
7. Letter from David L. Johnson to Barry Fogel, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 28, 1986). Concerning the granting of a variance to the wetlands regulations to allow for final closure of the landfill.
8. Letter from Helen R. Knight, Committee to Enforce Dump Controls to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 23, 1987). Concerning the odor problem at the site.
9. Memorandum from Helen R. Knight, Committee to Enforce Dump Controls to John W. Duggan and John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 21, 1987). Concerning notification that no visible progress has been made to construct a leachate collection facility or a venting system.
10. Memorandum from Helen R. Knight, Committee to Enforce Dump Controls to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 31, 1988). Concerning the odor problem at the site.
11. Memorandum from the Town of Billerica Board of Health to John W. Duggan and John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering, GHR Engineering Associates, Inc., Graypond Realty Trust, Richard Bento, Superfund Action Committee Selectman, Raymond G. Dougan, Commonwealth of Massachusetts Department of the Attorney General (January 31, 1989). Concerning notification of a February 8, 1989 meeting.

13.1 Correspondence (cont'd.)

12. Letter from John Gallagher, EPA Region I to Helen R. Knight, Committee to Enforce Dump Controls (December 1, 1989). Concerning the transmittal of the November 1989 "Phase IC Remedial Investigation Report - Volume I," Camp Dresser & McKee Inc.
13. Letter from John Gallagher, EPA Region I to JoAnne Giovino (December 7, 1989). Concerning the transmittal of the November 1989 "Phase IC Remedial Investigation Report - Volume I," Camp Dresser & McKee Inc.
14. Memorandum from John Gallagher, EPA Region I to Site File (December 28, 1989). Concerning the attached notes and data received from Helen R. Knight, Committee to Enforce Dump Controls.
15. Letter from John W. Morris, Town of Billerica Board of Health to Merrill S. Hohman, EPA Region I (January 2, 1990). Concerning the lack of progress at the site and the continuous odor problem.
16. "SAC Goals for Shaffer Dump," Superfund Action Committee (January 18, 1990).
17. Cross Reference: Letter from Conal C. Foley, EPA Region I to Jo Anne Giovino, Superfund Action Committee (March 26, 1990). Concerning the confirmation that the Superfund Action Committee no longer wishes to file an application for the single available Technical Assistance Grant [Filed and cited as entry number 1 in 13.7 Technical Assistance Grants].
18. Cross Reference: Letter from Mary H. Grealish, EPA Region I to Tim Coppinger (July 13, 1990). Concerning information on the available Technical Assistance Grant [Filed and cited as entry number 2 in 13.7 Technical Assistance Grants].
19. Cross Reference: Letter from Don McElroy, EPA Region I to Helen R. Knight, Committee to Enforce Dump Controls (August 16, 1990). Concerning the transmittal of the attached "Listing of Citizen Group Recipients of a Superfund Technical Assistance Grant," EPA Region I (July 12, 1990) [Filed and cited as entry number 3 in 13.7 Technical Assistance Grants].
20. Letter from Ralph M. Krau, Town of Billerica to Don McElroy, EPA Region I (January 24, 1991). Concerning a request that the Public Meeting be scheduled on February 5, 1991 and that the Public Comment Period begin on February 6, 1991.
21. Letter from Don McElroy, EPA Region I to Ralph M. Krau, Town of Billerica (January 25, 1991). Concerning approval of the extension of the Public Comment Period to March 16, 1991.
22. Letter from John W. Morris, Town of Billerica to Don McElroy, EPA Region I (January 25, 1991). Concerning a request that the Public Comment Period be extended.
23. Letter from JoAnne Giovino, Superfund Action Committee to Don McElroy, EPA Region I (January 28, 1991). Concerning a request that the Public Meeting be scheduled on February 5, 1991 and that the Public Comment Period begin on February 6, 1991.
24. Letter from Don McElroy, EPA Region I to John W. Morris, Town of Billerica (January 29, 1991). Concerning notification of the extension of the Public Comment Period to March 16, 1991.

13.3 News Clippings/Press Releases

News Clippings

1. "Report Details Iron Horse Park Pollutants," The Sun - Lowell, MA (August 5, 1987).
2. "Hazardous Waste Dumping Causes Irreversible Damage," Merrimack Valley Advertiser - Tewksbury, MA (August 23, 1989).

Press Releases

3. "Environmental News - EPA to Hold Public Meeting to Discuss Results of Study on the Shaffer Landfill at the Iron Horse Park Superfund Site," EPA Region I (August 7, 1989).
4. "Environmental News - EPA Releases Results of Study on the Shaffer Landfill at the Iron Horse Park Superfund Site," EPA Region I (December 8, 1989).
5. Cross Reference: "The United States Environmental Protection Agency Announces Technical Assistance Grants Program," EPA Region I [Filed and cited as entry number 4 in 13.7 Technical Assistance Grants].
6. "Environmental News - EPA Issues Supplement to Proposed Cleanup Plan for Shaffer Landfill, Iron Horse Park Superfund Site," EPA Region I (May 15, 1991).

13.4 Public Meetings

1. Meeting Agenda, Superfund Action Committee (November 9, 1983).
2. Letter from Sharon A. Checrallah and Helen R. Knight, Superfund Action Committee to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (November 12, 1983). Concerning appreciation for attending the November 9, 1983 meeting and the attached meeting notes.
3. Meeting Agenda, Superfund Action Committee (January 9, 1984).
4. Minutes of the February 22, 1984 Town of Billerica Superfund Action Coalition meeting.
5. Minutes of the June 19, 1984 Town of Billerica Superfund Action Coalition.
6. Letter from Sharon A. Checrallah, Superfund Action Committee to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 3, 1984). Concerning notification of the August 1, 1984 meeting to discuss progress of the capping operation.
7. Minutes of the August 1, 1984 Town of Billerica Superfund Action Coalition meeting.
8. Minutes of the October 10, 1984 Town of Billerica Superfund Action Coalition meeting.
9. Meeting Agenda, Superfund Action Committee Coalition (November 14, 1984).
10. Memorandum from Dotty Walker, Superfund Action Committee Coalition to Superfund Action Committee Coalition Members (March 10, 1985). Concerning notification of the March 27, 1985 meeting to discuss the Remedial Investigation work plan and transmittal of the attached meeting agenda.
11. Minutes of the March 27, 1985 Town of Billerica Superfund Action Coalition meeting.
12. Minutes of the August 14, 1985 Town of Billerica Superfund Action Coalition meeting.
13. Letter from Superfund Action Committee to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 23, 1985). Concerning confirmation of what issues the Commonwealth of Massachusetts Department of Environmental Quality Engineering agreed to assume responsibility for.

13.4 Public Meetings (cont'd.)

14. Minutes of the January 21, 1986 Town of Billerica Superfund Action Coalition meeting.
15. Minutes of the May 27, 1986 Town of Billerica Superfund Action Coalition meeting.
16. Meeting Agenda, Town of Billerica Superfund Action Committee and EPA Region I (November 18, 1986) with the attached "Suggested Topics for the Proposed Meeting on the Shaffer Landfill."
17. Meeting Agenda, Town of Billerica Superfund Action Committee (March 24, 1987) with attached annotated copy.
18. Meeting Agenda, Town of Billerica Superfund Action Committee (November 17, 1987) with the attached "Progress Report - B & M Lagoons."
19. Meeting Agenda, Town of Billerica Superfund Action Committee (March 30, 1988) with the attached March 3, 1988 Letter from Dorothy Walker, Superfund Action Committee to John Fitzgerald and John W. Duggan, Massachusetts Department of Environmental Quality Engineering and the "Proposed Outline for Presentation Regarding Leachate Containment."
20. Meeting Agenda (August 9, 1988). Concerning the agenda for the August 9, 1988 health study meeting.
21. Transcript, Proposed Plan Public Hearing (February 5, 1991).
22. Transcript, Proposed Plan Public Hearing (February 19, 1991).
23. "Iron Horse Park Site History," "Recommendations," "Groundwater Contamination at Iron Horse Park," "Organics Results Summary."

The record cited as entry number 24 may be reviewed, by appointment only, at EPA Region I Boston, Massachusetts.

24. Overhead Transparencies, EPA Region I.

13.5 Fact Sheets

1. "Superfund Program Fact Sheet," EPA Region I (August 1989). Concerning EPA investigation results for the Shaffer Landfill.

13.7 Technical Assistance Grants

1. Letter from Conal C. Foley, EPA Region I to Jo Anne Giovino, Superfund Action Committee (March 26, 1990). Concerning the confirmation that the Superfund Action Committee no longer wishes to file an application for the single available Technical Assistance Grant.
2. Letter from Mary H. Grealish, EPA Region I to Tim Coppinger (July 13, 1990). Concerning information on the available Technical Assistance Grant.
3. Letter from Don McElroy, EPA Region I to Helen R. Knight, Committee to Enforce Dump Controls (August 16, 1990). Concerning the transmittal of the attached "Listing of Citizen Group Recipients of a Superfund Technical Assistance Grant," EPA Region I (July 12, 1990).
4. "The United States Environmental Protection Agency Announces Technical Assistance Grants Program," EPA Region I.

14.0 Congressional Relations

14.1 Correspondence

1. Letter from Helen R. Knight, Committee to Enforce Dump Controls to Michael J. Rea, Member of the Commonwealth of Massachusetts House of Representatives (November 9, 1982). Concerning an update of site activities.
2. Letter from Dorothy P. Walker, Superfund Action Committee to Patricia McGovern, Member of the Commonwealth of Massachusetts Senate (June 2, 1989). Concerning the attached summary sheet and the request that immediate action be taken to cleanup the site leachate problem.
3. Letter from John Gallagher, EPA Region I to Edward Markey, Member of the U.S. House of Representatives (December 6, 1989). Concerning transmittal of the Remedial Investigation report.
4. Letter from John Gallagher, EPA Region I to Patricia McGovern, Member of the Commonwealth of Massachusetts Senate (December 6, 1989). Concerning transmittal of the Remedial Investigation report.
5. Letter from Patricia McGovern, Member of the Commonwealth of Massachusetts Senate to Julie Belaga, EPA Region I (January 23, 1990). Concerning the need for federal assistance in cleaning up the site.
6. Letter from Julie Belaga, EPA Region I to Patricia McGovern, Member of the Commonwealth of Massachusetts Senate (February 21, 1990). Concerning an update of site activities.
7. Letter from Edward M. Kennedy and John F. Kerry, Members of the United States Senate to Julie Belaga, EPA Region I (February 1, 1991). Concerning the request that the February 5, 1991 hearing be changed to an informal question and answer period.
8. Letter from Edward J. Markey, Member of the United States House of Representatives to Julie Belaga, EPA Region I (February 27, 1991). Concerning a request that a representative from the Town of Billerica be allowed to monitor the negotiations with the parties potentially responsible for the site cleanup.
9. Cross-Reference: Comments Dated March 15, 1991 from Edward J. Markey, Member of the United States Congress on the January 1991 Proposed Plan [Filed and cited as entry number 32 in 5.3 Responsiveness Summaries].
10. Letter from Julie Belaga, EPA Region I to Edward J. Markey, Member of the United States House of Representatives (March 20, 1991). Concerning the response to the February 27, 1991 letter requesting that a representative from the Town of Billerica be allowed to monitor the negotiations with the parties potentially responsible for the site cleanup.
11. Letter from Julie Belaga, EPA Region I to Edward J. Markey, Member of the United States House of Representatives (March 29, 1991). Concerning notification that EPA Region I received his comments on the January 1991 Proposed Plan.

17.0 Site Management Records

17.1 Correspondence

1. Letter from S.H. Morawski, Tennessee Gas Pipeline to Bruce Marshall, EPA Region I (September 30, 1987). Concerning transmittal of the attached sampling results taken from along the proposed trench line.

17.4 Site Photographs/Maps

1. Memorandum from Thomas R. Osberg, EPA Region I to Bruce Marshall, EPA Region I (April 3, 1987). Concerning transmittal of the attached "Site Analysis and Wetlands Assessment - Volume I," EPA Region I (March 1987).

17.5 Site Descriptions/Chronologies

Due to copyright restrictions, the record cited as entry number 1 may be reviewed, by appointment only, at EPA Region I Boston, Massachusetts.

1. "The Supply Mill on Content Brook in Massachusetts," Journal of Field Archaeology (Volume 3 Number 1 1976).
2. "Town of Billerica Information."

17.8 State and Local Technical Records

Correspondence

1. Letter Report from D.L. Higgins Jr. (March 8, 1965). Concerning the examination of the Pond Street Landfill.
2. Letter from John C. Collins, Town of Billerica Department of Health to P. Curtis (April 3, 1968). Concerning a proposed dump site in North Billerica. and the attached "Billerica Citizens Petition State for Dump Controls."
3. Letter from Emile J. Hamwey, Fay, Spofford & Thorndike, Inc. (Attorney for the Town of Billerica) to Richard Power, Commonwealth of Massachusetts Department of Public Health (February 15, 1973). Concerning additions and improvements to the Town of Billerica Sewage Treatment Plant.
4. Letter from Francis C. Emmons Jr., Emmons, Fleming & Bienveu, Inc. (Attorney for Graypond Realty Trust) to Kenneth A. Tarbell, Commonwealth of Massachusetts Department of Public Health (February 27, 1975). Concerning the division of the site into household waste and commercial waste sections and the proposal to accomplish compliance to the landfill regulations.
5. Letter from Kenneth A. Tarbell, Commonwealth of Massachusetts Department of Public Health to Francis C. Emmons Jr., Emmons, Fleming & Bienveu, Inc. (Attorney for Graypond Realty Trust) (March 14, 1975). Concerning receipt of the February 27, 1975 letter and the notion that Graypond Realty Trust is responsible for covering refuse at both the commercial and residential sections of the landfill.
6. Letter from Donald C. Bassett, Town of Billerica Health Department to Paul Anderson, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 16, 1975). Concerning notification that Roy Brothers, Inc. has been given permission to dispose of waste at the landfill on September 16, 1975 and September 17, 1975.
7. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Kenneth A. Tarbell, Middlesex Disposal Services, Inc. (February 27, 1981). Concerning review of the September 8, 1980 "Sieve Analysis," Arnold Greene Testing Laboratories, Inc. and notification that the dredge material from Nutting's Lake is too high in organic material and the particle size is too large.
8. Letter from Kenneth A. Tarbell, Middlesex Disposal Services, Inc. to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 10, 1984). Concerning the origins of the odor problems near the site.
9. Memorandum from Margo Thornton, Commonwealth of Massachusetts Department of Environmental Quality Engineering to File (March 23, 1984). Concerning visual observations and attached notes regarding the culverts within the watershed area of Gray Street.
10. Memorandum from Bill Sirull, Commonwealth of Massachusetts Department of Environmental Quality Engineering to File (June 22, 1984). Concerning a tour of the site with Helen R. Knight, Superfund Action Committee and a water sample taken from the site.

17.8 State and Local Technical Records (cont'd.)

11. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 16, 1984). Concerning transmittal of the plans for closure of the site.
12. Letter from Robert S. Cummings, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 31, 1984). Concerning a request for an extension of time in order to complete the "Final Environmental Impact Report."
13. Letter from Robert A. Lacourse, GHR Engineering Incorporated to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 1, 1985). Concerning average tonnage of waste disposed of at the site between February 13, 1985 and March 28, 1985.
14. Letter from Robert A. Lacourse, GHR Engineering Associates, Inc. to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 23, 1985). Concerning average tonnage of waste disposed of at the site between March 29, 1985 and May 18, 1985.
15. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Paul F. Talbot, Town of Billerica (November 15, 1985) with the attached October 30, 1985 Letter from Kenneth A. Tarbell, Middlesex Disposal Service, Inc. to Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering. Concerning notification that landfill expansion is not approved.
16. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to John FItzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 30, 1985).
17. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Middlesex Disposal Services, Inc. (January 21, 1986). Concerning operational, closure, and remedial activities at the site.
18. Letter from S.H. Morawski, Tennessee Gas Pipeline to John FItzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (March 25, 1986). Concerning the relocation of the 16" Concord Lateral through or near the site.
19. Memorandum from Burton Shaffer, Graypond Realty Trust to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 11, 1986). Concerning transmittal of the attached "Proposed Schedule for the Development of the Landfill Gas-to-Electricity Project as of May 30, 1986."
20. Letter from Joseph P. Salvetti, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 23, 1987). Concerning the proposed pumping tests to be performed at the site.
21. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Robert Cummings, GHR Engineering Associates, Inc. (January 26, 1987). Concerning the schedule for pump tests to be performed at the site.
22. Letter from Christine R. LeBlanc, GHR Engineering Associates, Inc. to Pat Lewis, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 29, 1987). Concerning transmittal of the attached revised January 9, 1987 letter and notification that the 3:1 slope on the west side of the commercial landfill does encroach on the Boarded Vegetated Wetlands by 13,300 square feet.
23. Letter from Christine R. LeBlanc, GHR Engineering Associates, Inc. to George Chretien, Greater Lawrence Sanitary District (January 30, 1987). Concerning transmittal of the attached "Request to Discharge Commercial and Industrial Holding Tank at the Greater Lawrence Sanitary District."

17.8 State and Local Technical Records (cont'd.)

24. Letter from Christine R. LeBlanc, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 2, 1987). Concerning information on the hydraulics of the pump test, water quality and leachate/groundwater disposal.
25. Letter from Christine R. LeBlanc, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 10, 1987). Concerning information on final slope stabilization at the site.
26. Letter from C.F. Mistretta, Commonwealth of Massachusetts Department of Public Works to Bruce Marshall, EPA Region I (July 10, 1987). Concerning notes of the July 8, 1987 meeting and the proposal of how to dispose of the material stored at the site.
27. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 14, 1987). Concerning certification of closure of the commercial and residential areas of the landfill and the following attachments:
    A. Letter from Richard R. DeBenedictis, GHR Engineering Associates, Inc. to William St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (November 16, 1984).
    B. Letter from Richard R. DeBenedictis, GHR Engineering Associates, Inc. to William St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 6, 1984).
    C. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to William St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 30, 1985).
    D. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 8, 1986).
28. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Graypond Realty Trust (November 25, 1987). Concerning the review of the plans, specifications, and the Standard Operating and Maintenance Procedures relative to the proposed installation of landfill gas control equipment.
29. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to Raymond G. Dougan, Commonwealth of Massachusetts Department of the Attorney General (January 22, 1988). Concerning transmittal of the attached "Hydrogeologic Assessment Chronology."
30. Letter from Ralph P. Penney, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 7, 1988). Concerning the transmittal of site closure documents.
31. Letter from Thomas A. Mackie, Wright & Moehrke (Attorney for Middlesex Disposal Services) to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 8, 1988). Concerning confirmation that GHR Engineering Associates, Inc. will be submitting monthly reports regarding closure activities at the landfill.
32. Letter from Mark Jablonski, GHR Engineering Associates, Inc. to John Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 18, 1989). Concerning the proposed pumping activities at the site.
33. Memorandum from John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 23, 1988). Concerning observations from the May 23, 1988 inspection of the site.

17.8 State and Local Technical Records (cont'd.)

34. Memorandum from John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 8, 1988). Concerning observations from the June 8, 1988 inspection of the site.
35. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Paul Talbot, Town of Billerica (January 5, 1989). Concerning notification that Graypond Realty Trust has been required to contain, collect, and provide for the treatment of Leachate contaminated groundwater at the site.
36. Letter from Paul Talbot, Town of Billerica to Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 26, 1989). Concerning notification that the Town of Billerica will not allow the contaminated groundwater to be treated at the Town's waste water treatment plant.
37. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 14, 1989). Concerning the scope of work regarding the pumping test to be performed at the site and the attached "Pump Test Fact Sheet."

Report

38. "Report and Plans for Improvements to Sanitary Landfill," Middlesex Disposal Service, Inc. (August 1981).

Report

39. "Environmental Impact Report," Middlesex Disposal Service, Inc. (February 17, 1982).

Report

40. "Preliminary Hydrogeologic Analysis," Goldberg-Zoino & Associates, Inc. for Middlesex Disposal Service, Inc. (April 1984).

Report

41. "Final Environmental Impact Report," GHR Engineering Associates, Inc. (September 1984).

Comments

42. "Certificate of the Secretary of Environmental Affairs on the Final Environmental Impact Report," Commonwealth of Massachusetts Executive Office of Environmental Affairs (September 24, 1984). Concerning the statement that the September 1984 "Final Environmental Impact Report," GHR Engineering Associates, Inc. does not adequately and properly comply with Massachusetts General Laws.
43. Comments Dated September 28, 1984 from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering on the September 1984 "Final Environmental Impact Report," GHR Engineering Associates, Inc.

17.8 State and Local Technical Records (cont'd.)

44. Comments Dated October 24, 1984 from William F.M. Hicks, Cuddy, Lynch, Sikora &Cunningham (Attorney for the twelve named citizen residents who are plaintiff/intervenors in The Department of Environmental Quality Engineering, *et al.* v. Irving Shaffer, *et al.*) on the September 1984 "Final Environmental Impact Report," GHR Engineering Associates, Inc.

Report

45. "Supplemental Final Environmental Impact Report," GHR Engineering Associates, Inc. (July 1985).

Comments

46. Comments Dated September 9, 1985 from Joseph P. Hannon, Northern Middlesex Area Commission on the July 1985 "Supplemental Final Environmental Impact Report," GHR Engineering Associates, Inc.
47. Comments Dated September 11, 1985 from Helen R. Knight, Superfund Action Committee on the July 1985 "Supplemental Final Environmental Impact Report," GHR Engineering Associates, Inc.
48. "Certificate of the Secretary of Environmental Affairs on the Final Environmental Impact Report," Commonwealth of Massachusetts Executive Office of Environmental Affairs (August 9, 1985). Concerning the statement that the July 1985 "Supplemental Final Environmental Impact Report," GHR Engineering Associates, Inc. adequately and properly complies with Massachusetts General Laws.
49. Comments Dated September 1985 from David L. Johnson on the July 1985 "Supplemental Final Environmental Impact Report," GHR Engineering Associates, Inc.
50. Comments Dated September 26, 1985 from Robert T. Legere, New England Testing Laboratory, Inc. on the July 1985 "Supplemental Final Environmental Impact Report," GHR Engineering Associates, Inc.
51. Comments Dated October 21, 1985 from David L. Johnson on the July 1985 "Supplemental Final Environmental Impact Report," GHR Engineering Associates, Inc.

Report

52. "Evaluation in Support of Variance Application Pursuant to 310 CMR 10.58 with Regard to Wetlands Requirements and Request to Vary Department of Environmental Quality Engineering Policy Regarding Final Landfill Slopes," GHR Engineering Associates, Inc. for Graypond Realty Trust (April 1986).

Report

53. "Supplemental Hydrogeologic and Water Quality Assessment," GHR Engineering Associates, Inc. for Graypond Realty Trust (April 1988).

Comments

54. Comments Dated January 5, 1989 from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering on the April 1988 "Supplemental Hydrogeologic and Water Quality Assessment," GHR Engineering Associates, Inc. and the July 26, 1988 "Additional Information for the Hydrogeologic and Water Quality Assessment," GHR Engineering Associates, Inc.

17.8 State and Local Technical Records (cont'd.)

Report

55. "Post-Closure Operation and Maintenance Plan," GHR Engineering Associates, Inc. (April 1989).

Comments

56. Letter from John W. Duggan and Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Irving Shaffer, Graypond Realty Trust (May 12, 1989). Concerning transmittal of the attached Comments Dated May 12, 1989 from John W. Duggan and Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering on the April 1989 "Post-Closure Operation and Maintenance Plan," GHR Engineering Associates, Inc.

Sampling and Analysis Data (Alliance Technologies Corporation)

57. Letter from Stephen V. Capone, Alliance Technologies Corporation to Edward Braczyk, Commonwealth of Massachusetts Department of Environmental Quality Engineering (November 7, 1988). Concerning transmittal of the attached "Summary Report - Gas Flare Testing - Passive Mode."

Sampling and Analysis Data (GHR Engineering Associates, Inc.)

58. Letter from Richard R. DeBenedictis, GHR Engineering Associates, Inc. to William St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 11, 1984). Concerning inspection of the site to ascertain existing conditions and the attached "Phase Closure of Residential Area - Table #1."
59. "Final Report," GHR Analytical Incorporated (March 19, 1986).
60. "Monitoring Well Installation Report," GHR Analytical Incorporated (April 17, 1986).
61. "Interpretive Report of Results of Billerica Landfill Conducted November 5 & 6, 1986," GHR Engineering Associates, Inc.
62. "Final Report," GHR Analytical Incorporated. (January 14, 1987).
63. Sampling Maps and Boring/Monitoring Well Logs (January 29, 1987).
64. Letter from Christine R. LeBlanc, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 2, 1987). Concerning transmittal of the attached August 14, 1987 "Final Report," GHR Analytical Incorporated.
65. Letter from Leanne E.S. Cobb, GHR Analytical Incorporated to Graypond Realty Trust (December 21, 1987). Concerning transmittal of the attached December 8, 1987 "Final Report," GHR Analytical Incorporated.
66. "Final Report," GHR Engineering Associates, Inc. (February 15, 1988).
67. Memorandum from Ralph P. Penney, GHR Engineering Associates, Inc. to Milton Shaffer, Graypond Realty Trust (June 8, 1988). Concerning transmittal of the May 25, 1988 "Final Report" of laboratory results taken from the landfill.
68. Letter from Ralph P. Penney, GHR Engineering Associates, Inc. to Dodie Brownlee and John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 26, 1988). Concerning transmittal of the attached contour maps associated with the "Hydrogeologic and Water Quality Assessment."
69. "Final Report," GHR Engineering Associates, Inc. (January 31, 1989).
70. "Groundwater and Surface Water Quality Data for April 1989," GHR Engineering Associates, Inc. (April 1989).
71. "Draft Preliminary Report," GHR Engineering Associates, Inc. (June 6, 1989).

17.8 State and Local Technical Records (cont'd.)

72. Letter from Robert S. Cummings, GHR Engineering Associates, Inc. to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 20, 1989). Concerning the historical analysis of ground and surface water quality data using data from sampling completed in April 1989.

Sampling and Analysis Data (Goldberg-Zoino & Associates, Inc.)

73. Memorandum from Sara R. Harris, Goldberg-Zoino & Associates, Inc. to William St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 21, 1984). Concerning transmittal of the attached results of Goldberg-Zoino & Associates, Inc.'s soils laboratory permeability testing of cover material from the landfill.
74. Boring Logs, Goldberg-Zoino & Associates, Inc. (June 27, 1984).
75. Gradation Tests, Goldberg-Zoino & Associates, Inc. (July 1984).
76. Memorandum from Dan Schulze, Goldberg-Zoino & Associates, Inc. to Bob Cummings, GHR Engineering Associates, Inc. (June 5, 1986). Concerning transmittal of the attached "Laboratory Testing Data Summary," "Compaction-Gradation Tests," and "Laboratory Test Procedures."
77. "Laboratory Testing Data Summary," Goldberg-Zoino & Associates, Inc. (August 1986).

Sampling and Analysis Data (Middlesex Disposal)

78. "Draft Ambient Air Monitoring in Billerica, Massachusetts," MDS Advanced Analytics, Inc. (June 1986).
79. "Final Report - Ambient Air Monitoring in Billerica, Massachusetts," MDS Advanced Analytics, Inc. (June 1986).

Work Plans and Progress Reports (Alliance Technologies Corporation)

80. Letter from Howard J. Schiff, Alliance Technologies Corporation to Edward Braczyk, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 8, 1988). Concerning the attached "Graypond Realty Trust Billerica Landfill Flare Test Program Tentative Schedule."
81. Letter from Stephen V. Capone, Alliance Technologies Corporation to Irving Shaffer, Graypond Realty Corporation (May 17, 1989). Concerning the monthly report for March 1989.
82. Letter from Stephen V. Capone, Alliance Technologies Corporation to Irving Shaffer, Graypond Realty Corporation (May 17, 1989). Concerning the monthly report for April 1989.
83. Letter from Stephen V. Capone, Alliance Technologies Corporation to Irving Shaffer, Graypond Realty Corporation (June 12, 1989). Concerning the monthly report for May 1989.

17.8 State and Local Technical Records (cont'd.)

Work Plans and Progress Reports (Commonwealth of Massachusetts Department of Environmental Quality Engineering)

84. Memorandum from Thomas F. McLoughlin, Commonwealth of Massachusetts Department of Public Health to File (February 27, 1968). Concerning an inspection of the proposed landfill site off Billerica Avenue. The following are attached:
    A. Memorandum from Merrill M. Plunkett, Town of Billerica to File (February 26, 1968). Concerning an inspection of the proposed landfill site adjacent to the existing town dump.
    B. Letter from Richard R. Albanese, Town of Billerica Health Department to Thomas F. McLoughlin, Commonwealth of Massachusetts Department of Public Health (February 21, 1968). Concerning a request for inspection of the dump site for conversion to a sanitary landfill.
    C. Letter from Richard R. Albanese, Town of Billerica Health Department to Thomas F. McLoughlin, Commonwealth of Massachusetts Department of Public Health (February 21, 1968). Concerning a request for inspection of the Arakelian property and the Corenco property.
    D. Letter from Robert E. Seeley, Dump Study Committee to Marion D. Gould, Town of Billerica (February 15, 1968). Concerning preparation for the March 9, 1968 Town Meeting.
85. "Report of the Billerica Dump Study Committee - 1967-1968."
86. Letter from William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Robert Hamilton, Shawsheen River Watershed Association (August 13, 1981). Concerning transmittal of the attached "Reports and Plans for Improvements to Sanitary Landfill," Middlesex Disposal Service, Inc. (August 1981).
87. "Certificate of the Secretary of Environmental Affairs on the Draft Environmental Impact Report," Commonwealth of Massachusetts Executive Office of Environmental Affairs (March 8, 1982). Concerning the statement that the March 1982 "Draft Environmental Impact Report," Middlesex Disposal Service, Inc. does not adequately and properly comply with Massachusetts General Laws.
88. "Status Report - Solid/Hazardous Waste Site Assessment" (February 9, 1983). The following are attached:
    A. Memorandum from Joe Dorant, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Sabin M. Lord, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 29, 1980). Concerning the investigation of a report of salt leaching into a nearby brook.
    B. "Monthly Operation Report-Licensed Hazardous Waste Collector."
    C. Letter from E.V. Fitzpatrick, Division of Surveillance & Analysis to H.B. Berkshire, Boston and Maine Corporation (November 29, 1974). Concerning a request for delivery of the Spill Prevention Control and Countermeasure (SPCC) Plans before an extension of time to implement those plans can be granted.
    D. Letter from E.V. Fitzpatrick, Division of Surveillance & Analysis to H.B. Berkshire, Boston and Maine Corporation (July 12, 1974). Concerning notification that some facilities may be exempt from submitting Spill Prevention Control and Countermeasure (SPCC) Plans.
    E. Letter from E.V. Fitzpatrick, Division of Surveillance & Analysis Boston and Maine Corporation (January 13, 1975). Concerning the request for extensions of time to implement Spill Prevention Control and Countermeasure (SPCC) Plans.

17.8 State and Local Technical Records (cont'd.)

89. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Middlesex Disposal Services, Inc. (October 9, 1987). Concerning approval of GHR Engineering Associates, Inc.'s plan to address leachate seeps and erosion channels and the attached August 26, 1987 Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Burton Shaffer, Middlesex Disposal Services, Inc.
90. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Irving Shaffer, Graypond Realty Trust (June 28, 1988). Concerning the request for additional maps associated with the "Supplemental Hydrogeologic and Water Assessment," GHR Engineering Associates, Inc.
91. Letter from Edward A. Kunce, Department of Environmental Quality Engineering to Valerie A. Talmadge, Commonwealth of Massachusetts Historical Commission (July 10, 1987). Concerning transmittal of the attached "Notice of Effect to Historic Properties."
92. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Irving Shaffer, Graypond Realty Trust (December 3, 1988). Concerning issues raised in the October 25, 1988 "Inclusive Monthly Activities Report from July 1988," GHR Engineering Associates, Inc.
93. Letter from Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Irving Shaffer, Graypond Realty Trust (January 5, 1989). Concerning review of the April 1988 "Supplemental Hydrogeologic and Water Quality Assessment," GHR Engineering Associates, Inc. and the July 26, 1988 Additional information for the Hydrogeologic and Water Quality Assessment," GHR Engineering Associates, Inc.
94. Letter from John W. Duggan and Richard J. Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering to Mark Jablonski, GHR Engineering Associates, Inc. (May 12, 1989). Concerning review of the April 12, 1989 "Post-Closure Operation and Maintenance Plan," GHR Engineering Associates, Inc.

Work Plans and Progress Reports (GHR Engineering Corporation)

95. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 15, 1984). Concerning certification of work done by C.J. Mabardy, Inc. in the commercial area of the landfill.
96. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 21, 1984). Concerning the availability of final cover material on-site at the landfill.
97. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 2, 1984). Concerning Status Report No. 1.
98. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 2, 1984). Concerning the July 2, 1984 site inspection.
99. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 16, 1984). Concerning Status Report No. 2.

17.8 State and Local Technical Records (cont'd.)

100. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 17, 1984). Concerning the July 13, 1984 site inspection.
101. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 31, 1984). Concerning Status Report No. 3.
102. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 6, 1984). Concerning the July 31, 1984 site inspection.
103. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 20, 1984). Concerning the delay in installing public water service to Gray Street residents.
104. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 20, 1984). Concerning Status Report No. 4 and the attached Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 20, 1984) regarding the August 15, 1984 site inspection.
105. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 21, 1984). Concerning reasons for an extension for the placement of intermediate cover in the residential area.
106. Letter from Robert S. Cummings, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 31, 1984). Concerning delay of submission of the Final Environmental Impact Report
107. Letter from Robert S. Cummings, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 31, 1984). Concerning Status Report No. 5.
108. Letter from Robert S. Cummings, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 4, 1984). Concerning a bi-weekly inspection of the construction activities for the closure of the commercial area of the site.
109. Letter from Robert S. Cummings, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 18, 1984). Concerning Status Report No. 6.
110. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 18, 1984). Concerning a bi-weekly inspection of the construction activities for the closure of the commercial area of the site.
111. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 3, 1984). Concerning Status Report No. 7.
112. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 3, 1984). Concerning a bi-weekly inspection of the construction activities for the closure of the commercial area of the site.
113. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 26, 1984). Concerning Status Report No. 8.

17.8 State and Local Technical Records (cont'd.)

114. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 26, 1984). Concerning a bi-weekly inspection of the construction activities for the closure of the commercial area of the site.
115. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (November 16, 1984). Concerning a bi-weekly inspection of the construction activities for the closure of the commercial area of the site.
116. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (November 19, 1984). Concerning Status Report No. 10.
117. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 6, 1984). Concerning Status Report No. 11.
118. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 6, 1984). Concerning a bi-weekly inspection of the construction activities for the closure of the commercial area of the site.
119. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 20, 1984). Concerning Status Report No. 12.
120. Letter from Richard R. DeBenedictis, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 10, 1985). Concerning a bi-weekly inspection of the construction activities for the closure of the commercial area of the site.
121. Letter from Robert A. Lacourse, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 4, 1985). Concerning Status Report No. 13.
122. Letter from Robert A. Lacourse, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (March 6, 1985). Concerning Status Report No. 14.
123. Letter from Robert A. Lacourse, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 1, 1985). Concerning Status Report No. 15.
124. Letter from Robert A. Lacourse, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 23, 1985). Concerning Status Report No. 16.
125. Letter from Robert S. Cummings, GHR Engineering Corporation to William J. St. Hilaire, Commonwealth of Massachusetts Department of Environmental Quality Engineering (November 27, 1985). Concerning the attached September 16, 1985 Memorandum from Bill Swanson, Camp Dresser & McKee Inc. to File and the descriptions of tasks that have to be done to complete the remedial design.
126. Letter from Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 11, 1985). Concerning Status Report No. 17.
127. Letter from Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 12, 1985). Concerning Status Report No. 18.
128. Letter from Robert S. Cummings, GHR Engineering Corporation to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (March 24, 1986). Concerning notification that Task 1 of the remedial design work as described in the February 19, 1986 letter has been completed.

17.8 State and Local Technical Records (cont'd.)

129. Letter from Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (March 24, 1986). Concerning Status Report No. 19.
130. Letter from Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 6, 1986). Concerning the results of an inspection of the site.
131. Letter from Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 1, 1986). Concerning the results of an inspection of the site.
132. Letter from Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 30, 1986). Concerning Status Report No. 22.
133. "Addendum to Scope of Work - Additional Hydrogeologic and Water Quality Assessment," GHR Engineering Corporation (October 21, 1986).
134. Letter from Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 8, 1986). Concerning Status Report No. 23.
135. Letter from Christine R. LeBlanc and Robert S. Cummings, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 22, 1986). Concerning Status Report No. 24.
136. Letter from Christine R. LeBlanc, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (December 24, 1986). Concerning progress made in securing access and obtaining permission for the installation of groundwater monitoring wells near the landfill.
137. Letter from Christine R. LeBlanc, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 4, 1987). Concerning closure activities report for the year ending 1986.
138. Letter from Christine R. LeBlanc, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 30, 1987). Concerning Status Report No. 25.
139. Letter from Christine R. LeBlanc, GHR Engineering Corporation to Richard Chalpin, Commonwealth of Massachusetts Department of Environmental Quality Engineering (March 10, 1987). Concerning Status Report No. 26.
140. "Draft Supplemental Evaluation in Support of Variance Application Pursuant to 310 CMR 10.58 With Regard to Wetlands Requirements and Request to Vary department of Environmental Quality Engineering Policy Regarding Final Landfill Slopes," GHR Engineering Corporation for Graypond Realty Trust (April 1987).
141. Letter from Christine R. LeBlanc, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 1, 1987). Concerning Status Report No. 27.
142. Letter from Joseph P. Salvetti, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 21, 1987). Concerning installation of monitoring wells.
143. Letter from Christine R. LeBlanc, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 11, 1987). Concerning Status Report No. 28.
144. Letter from Christine R. LeBlanc, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 10, 1987). Concerning an inspection of the site.

17.8 State and Local Technical Records (cont'd.)

145. Letter from Christine R. LeBlanc, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (September 30, 1987). Concerning information on leachate seeps present at the site.
146. Letter from Robert S. Cummings, GHR Engineering Corporation to Raymond G. Dougan, Commonwealth of Massachusetts Department of the Attorney General (January 22, 1988). Concerning transmittal of the attached "Hydrogeologic Assessment Chronology."
147. Letter from Ralph P. Penney, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 10, 1988). Concerning the Monthly Activities Report for April 1988.
148. Letter from Ralph P. Penney, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 17, 1988). Concerning the Monthly Activities Report for May 1988.
149. Letter from Ralph P. Penney, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (August 11, 1988). Concerning the Monthly Activities Report for June 1988.
150. Letter from Ralph P. Penney, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (October 25, 1988). Concerning the Monthly Activities Report for July 1988.
151. Letter from Mark Jablonski, GHR Engineering Corporation to Steven Capone, Alliance Technology Corporation (April 12, 1989). Concerning submittal of the "Methane Gas Recovery Assessment."
152. Letter from Mark Jablonski, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (April 24, 1989). Concerning the Post Closure Monthly Inspection Report for April 21, 1989.
153. Letter from Mark Jablonski, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (May 31, 1989). Concerning the Post Closure Monthly Inspection Report for May 26, 1989.
154. Letter from Robert S. Cummings, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (June 14, 1989). Concerning the scope of work regarding the pumping test to be performed at the site and the attached "Pump Test Fact Sheet."
155. Letter from Mark Jablonski, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 6, 1989). Concerning the Post Closure Monthly Inspection Report for June 28, 1989.
156. Letter from Robert S. Cummings, GHR Engineering Corporation to Brian Furman, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 12, 1989). Concerning the attached scope of work regarding the pumping test to be performed at the site and the "Pump Test Fact Sheet."
157. Letter from Mark Jablonski, GHR Engineering Corporation to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (July 13, 1989). Concerning an update to activities for the first half of 1989 and the attached June 23, 1989 Letter from Mark Jablonski, GHR Engineering Corporation to Jim Sprague, Commonwealth of Massachusetts Department of Environmental Quality Engineering.

17.8 State and Local Technical Records (cont'd.)

158. Letter from Mark Jablonski, GHR Engineering Corporation to Irving Shaffer, Graypond Realty Trust (July 18, 1989). Concerning the June 28, 1989 inspection of the site.
159. "Scope of Work - Additional Hydrogeologic and Water Quality Assessment," GHR Engineering Corporation.

Work Plans and Progress Reports (Graypond Realty Trust)

160. Letter from Burton Shaffer, Graypond Realty Trust to John Fitzgerald, Commonwealth of Massachusetts Department of Environmental Quality Engineering (February 26, 1986). Concerning transmittal of the attached "Proposal to Graypond Realty Trust to Develop a Landfill Gas Recovery Plant," Northern Energy Recovery (January 1986).
161. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to Raymond Dougan, Commonwealth of Massachusetts Department of the Attorney General (October 23, 1987). Concerning the schedule for the work required to complete closure of the landfill.
162. Letter from Anton T. Moehrke, Wright & Moehrke (Attorney for Graypond Realty Trust) to Raymond Dougan, Commonwealth of Massachusetts Department of the Attorney General (October 30, 1987). Concerning closure work at the landfill.
163. Letter from Rebecca A. Backman, Wright & Moehrke (Attorney for Graypond Realty Trust) to John W. Duggan, Commonwealth of Massachusetts Department of Environmental Quality Engineering (January 20, 1989). Concerning the response to the April 1988 "Supplemental Hydrogeologic and Water Quality Assessment," GHR Engineering Corporation.

Work Plans and Progress Reports (Middlesex Disposal Service, Inc.)

164. "Report on Operations from July 26-31, 1982 and August 2-7, 1982," K.A. Tarbell (August 11, 1982).
165. "Report on Operations," Middlesex Disposal Service, Inc. (August 9-14, 1982).
166. "Report on Operations," Middlesex Disposal Service, Inc. (August 16-21, 1982).
167. "Report on Operations," Middlesex Disposal Service, Inc. (August 23-28, 1982).
168. "Report on Operations," Middlesex Disposal Service, Inc. (September 13-18, 1982).
169. "Report on Operations," Middlesex Disposal Service, Inc. (October 4-9, 1982).
170. "Report on Operations," Middlesex Disposal Service, Inc. (October 11-16, 1982).
171. "Report on Operations," Middlesex Disposal Service, Inc. (October 18-23, 1982).
172. "Report on Operations," Middlesex Disposal Service, Inc. (October 25-30, 1982).
173. "Report on Operations," Middlesex Disposal Service, Inc. (November 1-6, 1982).
174. "Report on Operations," Middlesex Disposal Service, Inc. (November 8-13, 1982).
175. "Report on Operations," Middlesex Disposal Service, Inc. (November 15-20, 1982).
176. "Report on Operations," Middlesex Disposal Service, Inc. (November 22-27, 1982).

17.8 State and Local Technical Records (cont'd.)

177. "Report on Operations," Middlesex Disposal Service, Inc. (November 29-December 4, 1982).
178. "Report on Operations," Middlesex Disposal Service, Inc. (December 6-11, 1982).
179. "Report on Operations," Middlesex Disposal Service, Inc. (December 13-18, 1982).
180. "Report on Operations," Middlesex Disposal Service, Inc. (December 1983).
181. "Report on Operations," Middlesex Disposal Service, Inc. (January 1984).
182. "Report on Operations," Middlesex Disposal Service, Inc. (February 1984).
183. "Report on Operations," Middlesex Disposal Service, Inc. (March 1984).
184. "Report on Operations," Middlesex Disposal Service, Inc. (April 1984).
185. "Report on Operations," Middlesex Disposal Service, Inc. (May 1984).

Section II

Guidance Documents

GUIDANCE DOCUMENTS

EPA guidance documents may be reviewed at EPA Region I, Boston, Massachusetts.

General EPA Guidance Documents

1. U.S. Environmental Protection Agency. Hazardous Waste Engineering Research Laboratory. Handbook for Stabilization/Solidification of Hazardous Waste (EPA/540/2-86/001), June 1986.

2. U.S. Environmental Protection Agency. Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended October 17, 1986.

3. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Compliance with Other Laws Manual (EPA/540/G-89/006, OSWER Directive 9234.1-01), August 1988.

4. U.S. Environmental Protection Agency. Office of Emergency and Remedial Response. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) (Interim Final) (EPA/540/G-89/004, OSWER Directive 9355.3-01), October 1988.

5. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. A Guide on Remedial Actions for Contaminated Ground Water (OSWER Directive 9283.1-2FS), April 1989.

6. U.S. Environmental Protection Agency. Office of Research and Development. Technical Guidance Document: Final Covers on Hazardous Waste Landfills and Surface Impoundments (EPA/530-SW-89-047), July 1989.

7. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) Compliance with Other Laws Manual - Part II: Clean Air Act and Other Environmental Statutes and State Requirements (EPA/540/G-89/009, OSWER Directive 9234.1-02), August 1989.

8. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws Manual - RCRA ARARs: Focus and Closure Requirements (OSWER Directive 9234.2-04), October 1989.

9. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. CERCLA Compliance with Other Laws Manual - Overview of ARARs - Focus on ARAR Waivers (Publication 9234.2-03/FS), December 1989.

10. U.S. Environmental Protection Agency. National Oil and Hazardous Substances Pollution Control Plan Code of Federal Regulations, Title 40, Part 300, March 8, 1990.

APPENDIX G

Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Protection

Daniel S. Greenbaum
Commissioner

June 24, 1991

Ms. Julie Belaga
Regional Administrator
US EPA
JFK Federal Building
Boston, MA 02203

RE: Iron Horse Park Federal Superfund Site, Billerica
Shaffer Landfill Operable Unit

ROD Concurrence

Dear Ms. Belaga:

The Department of Environmental Protection (the "Department") has reviewed the Selected Remedy recommended by the EPA for measures at the Shaffer Landfill Operable Unit of the Iron Horse Park Federal Superfund Site (the "Site"). The Department concurs with EPA's Selected Remedy for this Operable Unit.

The Department has evaluated the EPA's Selected Remedy for consistency with M.G.L. Chapter 21E and the Massachusetts Contingency Plan ("MCP"). The Selected Remedy includes source control and management of migration measures to address closure of the landfill. This Operable Unit's remedial action has the following components:

1) Reconstruction of the entire landfill cap
2) Construction, operation, and maintenance of leachate collection facilities
3) Off-site treatment and disposal of leachate
4) Construction of a perimeter fence
5) Monitoring of groundwater and surface water quality
6) Institutional controls
7) Monitoring and improvement, if necessary, of the gas collection/flare system

The Department has determined that the Selected Remedy for this Operable Unit is a remedial action on a portion of the Site which would be consistent with a future permanent or temporary solution for the entire Site. M.G.L. Chapter 21E allows the implementation of remedies on portions of a disposal site. Once the remedial actions are developed for the remainder of this Site, the Department will evaluate the reduction of total site

risk, in conformance with the MCP.

The Department has reviewed the ARARs identified for the Shaffer Landfill and has determined that the Selected Remedy appears to meet these. The ARARs will continue to be evaluated as remedial design progresses and during implementation and operation of the remedy. In addition, we will continue to identify ARARs and evaluate consistency with M.G.L. Chapter 21E during evaluation of the third operable unit of the Iron Horse Park Site.

You should be aware that the EPA's Project Manager, Don McElroy, should be commended for a superb job in managing this complex project. His efforts to include the State in the Superfund process at this site have been greatly appreciated.

The Department looks forward to working with EPA in the design and implementation of the Selected Remedy. If you have any questions or require additional information please contact Dale Young, Project Manager, at 292-5785.

Very truly yours,

Daniel S. Greenbaum
Commissioner
Department of Environmental Protection

cc:
Dale Young, DEP-BWSC-Boston
Don Nagle, DEP-OGC-Boston
Joel Hartley, DEP-DSW-NERO
Deb Gallagher, DEP-DSW-Boston
John Fitzgerald, DEP-BWSC-NERO
Betsy Harper, Office of the Attorney General
Tom Higgins, DEP-Boston
Ed Braezyk, DEP-AQC-NERO
Barbara Kwetz, DEP-AQC-NERO
Janet Waldron, DEP-BWSC